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October 17, 2018

Big Rivers Electric Corporation
Sebree Generating Station
9000 Highway 2096
Robards, Kentucky 42452

Engineer's Certification of Placement Above the Uppermost Aquifer
Existing Green CCR Surface Impoundment
EPA Final CCR Rule
Sebree Station
Robards, Kentucky

1.0 PURPOSE

The purpose of this document is to certify that the Placement above Sebree "Green" Existing CCR Surface Impoundment is in compliance with the Placement above the Uppermost Aquifer requirement of the Final CCR Rule at 40 CFR §257.60. Presented below is the project background, summary of findings, limitations and certification.

2.0 BACKGROUND

In accordance with 40 CFR §257.60, the owner/operator of an existing CCR Surface Impoundment must demonstrate that the base of the unit is located no less than 1.52 meters (five feet) above the upper limit of the uppermost aquifer, or must demonstrate that there will not be an intermittent, recurring, or sustained hydraulic connection between any portion of the base of the CCR unit and the uppermost aquifer due to normal fluctuations in groundwater elevations (including the seasonal high water table). In accordance with 40 CFR §257.60(c)(1), the demonstration must be made by October 17, 2018. If such demonstration cannot be made, the unit is subject to the closure or retrofit requirements of 40 CFR §257.101

3.0 SUMMARY OF FINDINGS

Available data regarding site groundwater, site geology, and physical limits of the unit for the Green Surface Impoundment do not evidence a 5-foot separation between the base of the impoundment and the uppermost limit of the uppermost aquifer and they do not support a lack of hydraulic connectivity between the unit and the aquifer as specified in 40 CFR §257.60(a). Therefore the unit does not meet the Placement above the Uppermost Aquifer requirement of 40 CFR §257.60(a).

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4.0 CERTIFICATION

I, Michael Brian Cole, being a Registered Professional Engineer in good standing in the State of Kentucky, do hereby certify, to the best of my knowledge, information, and belief, that the information contained in this certification has been prepared in accordance with the accepted practice of engineering. I certify, for the above-referenced CCR Unit, available data do not support a demonstration of Placement above the Uppermost Aquifer that meets the requirements of 40 CFR § 257.60(a).

M. Brian Cole
Printed Name

October 17, 2018
Date

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500 W Jefferson St Suite 1600
Louisville, KY 40202

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ATTACHMENTS: Placement above the Uppermost Aquifer Demonstration for Coal Combustion Residuals

Big Rivers ELECTRIC CORPORATION

Your Touchstone Energy® Cooperative

Existing Green CCR Surface Impoundment

Disposal of Coal Combustion Residuals (CCR) from Electric Utilites Final Rule

Placement above the Uppermost Aquifer Demonstration for Coal Combustion Residuals (CCR)

October 17, 2018

Prepared by

AECOM

Project Number: 60570534

TABLE OF CONTENTS

FIGURES

ATTACHMENTS

1.0 INTRODUCTION

1.1 Objective

The purpose of this demonstration is to document compliance with 40 Code of Federal Regulations (CFR) §257.60 of the Environmental Protection Agency Final Coal Combustion Residual Rule (EPA Final CCR Rule) regarding the Placement above the Uppermost Aquifer Demonstration requirement for the existing "Green" Surface Impoundment at the Big Rivers Electric Corporation (BREC) Sebree Station in Sebree, Kentucky.

1.2 Rule Requirements

As required by 40 CFR §257.60(a) of the EPA Final CCR Rule, any existing CCR Surface Impoundments must be constructed with a base that is located no less than 1.52 meters (5 feet) above the upper limit of the uppermost aquifer, or must demonstrate that there will not be an intermittent, recurring, or sustained hydraulic connection between any portion of the base of the CCR unit and the uppermost aquifer due to normal fluctuations in groundwater elevation. The "uppermost aquifer" is defined by 40 CFR §257.40 as the geologic formation nearest the natural ground surface that is an aquifer, as well as lower aquifers that are hydraulically interconnected with this aquifer within the facility's property boundary. This definition includes a shallow, deep, perched, confined or unconfined aquifer, provided it yields usable water.

The demonstration is due by October 17, 2018 in accordance with 40 CFR §257.60(c)(1). Those Surface Impoundments that cannot demonstrate compliance with the requirement of 40 CFR §257.60(a) are required by 40 CFR §257.60(c)(4) to cease placement of CCR in the unit within 6 months (April 2019).

1.3 Methodology/Background

The demonstration method involves the use of existing documentation of pertinent geologic and hydrogeologic information to develop a conceptual site model (CSM) for the uppermost aquifer inclusive of the definition of its uppermost limit, normal fluctuations in groundwater elevation, and the potential for the aquifer's hydraulic interconnection with overlying strata and the planned landfill limits. Existing documentation includes state and/or federal geologic maps and water resources publications, the logs of borings drilled on site for geotechnical purposes, the logs of monitoring wells installed on site and in surrounding areas, and design drawings for the unit.

1.4 Site Background

Big Rivers Electric Corporation (BREC) owns and operates the "Sebree" Station in Sebree, Kentucky. The Sebree Station is located in Webster County, approximately 3.2 miles northeast of the town of Sebree, Kentucky situated immediately east of the Pennyrile Parkway approximately 1.5 miles north of the intersection of the Pennyrile Parkway and Kentucky Route 56 (see Figure 1). Sebree Station is composed of 2 Green generating units, one Reid generating unit, and 2 HMP&L generating units. The Green Surface Impoundment is located directly south of the Sebree Station, situated north of the Green CCR Landfill. The current Green Surface Impoundment footprint is approximately 16 acres (Figure 2).

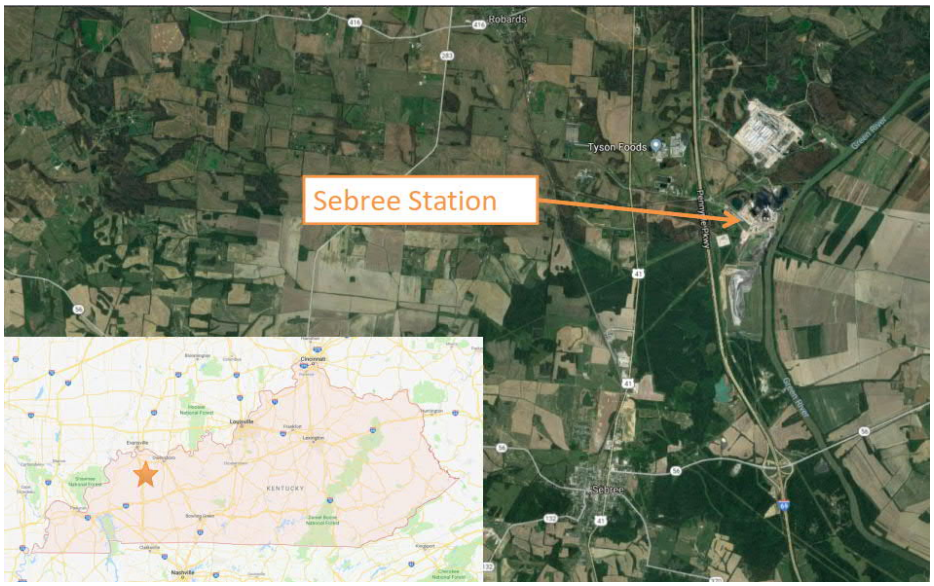


Figure 1: BREC Sebree Site Location

Figure 2: BREC Green Surface Impoundment Site Location

1.5 Site History

The Green Surface Impoundment is a combined incised/dike earthen embankment structure. It is diked on the west, south and east sides, while the north side is incised. The south dike has the greatest height reaching approximately 20 feet. The original ground surface within the Surface Impoundment footprint was irregular and the predominant features were small stream valleys draining eastward to Green River. Most of the central portion of the south dike was constructed on a subdued ridge. The toe of the outboard slope intersected a lower drainage area. Underlying preconstruction soils consisted of Loring-Grenada, Loring-Zanesville-Wellston (Henderson County) and Loring-Wellston-Zanesville (Webster County) soil associations that are generally characterized as well drained to moderately well-drained soils on nearly level to sloping uplands.

The CCR unit has been in place for 40 plus years and is used for the placement of CCR material; currently slurried bottom ash. The immediate watershed that drains to the CCR unit, and in which the CCR unit is considered to be located, is unnamed and 54.13 acres in size. The unnamed watershed discharges from the CCR impoundment outflow structure and is routed to the Green River.

The west dike is generally less than 5-feet in height and the south dike reaches a maximum height of 19.5 feet. The east dike reaches a maximum height of approximately 8 feet and is buttressed with a secondary parallel embankment that serves as a 40-foot wide roadway. The Burns and Roe, Inc., Engineering and Consultants June 30, 1978, site grading plans show the original construction layout and ground contours for the impoundment site. Bottom ash has been placed above the normal pool along the inboard side, essentially creating reclaimed land.

The impoundment discharge consists of two corrugated steel pipes, each 30 inches in diameter. The pipe intakes are through a common concrete headwall collection structure with a variable height steel debris deflector on each pipe intake.

2.0 GEOLOGY

The site lies in the Western Kentucky Coalfields, a gently rolling upland. In the vicinity of the site, maximum topographic relief is on the order of 80 feet. Surface drainage is to the south to Groves Creek, a primary tributary to the Green River, and to the east to the Green River.

Published geologic mapping (Murphy, 2007) shows the site to be immediately underlain by unconsolidated loess representing the Pleistocene and Holocone geologic epoch and unconsolidated alluvium representing the Pleistocene and Holocene epochs. The loess reportedly consists of sandy and clayey silt. The alluvium reportedly consists of silt and clay with lesser amounts of sand and gravel.

The unconsolidated materials are shown to be underlain by the base of the Shelburn Formation (formerly identified as the Lisman Formation (Fairer, 1973)) and the Carbondale Formation, both of which represent the Pennsylvanian Geologic Period. The West Franklin Member consists of one to three layers of limestone interbedded by calcareous clay shale, and comprises the top of the Shelburn Formation. The Providence Limestone Member, consisting of limestone and interbedded shale, comprises the base of the Shelburn Formation. The Providence Limestone Member is reportedly absent in much of the area due to erosional channeling. Due to its discontinuous character and the presence of interbedded shale, hydrologically significant karst features are not present in the Providence Limestone Member. The underlying Carbondale Formation consists of cyclic sequences of sandstones, shales, siltstones and coals. The Carbondale sediments were deposited in a fluvial-deltaic system. As a result of this depositional environment, the lithologic units of the Carbondale tend to be lenticular bodies rather than continuous sheet-like strata. Gradational and abrupt horizontal changes in lithology are often encountered.

The structure contours illustrated on the geologic map (Murphy, 2007) are based on the altitude of the No. 9 coal seam, and show the site to lie on the flank of a gentle anticline. Stratigraphic dip is shown to be on the order of 35 feet per mile to the southeast. No faults or other significant structural features are depicted on the geologic map.

3.0 HYDROGEOLOGY

The stratigraphic interval considered as the most prominent water transmitting zone within and adjacent to the Sebree Generating Station is material identified as the Upper Sandstone Member (Sebree sandstone) of the Carbondale Formation. The United States Geologic Survey (USGS) Geologic Map of the Robards Quadrangle describes the Sebree sandstone sequence as "Siltstone, sandstone, shale and coal: Siltstone, light- to medium-gray, micaceous, thin-bedded, and locally calcareous. Sandstone, light- to medium-gray, grayish- and yellowish-brown, fine- to medium-grained slightly micaceous, thin-bedded to massive; locally fills channels."

For purposes of compliance with the CCR Rule groundwater monitoring requirements; this sequence, and in particular the member sandstone intervals, is considered to be the uppermost aquifer underlying the Green CCR Surface Impoundment.

The sandstone units in the upper Carbondale Formation reportedly can provide well yields of 500 gallons per day (gpd) or greater with some reported yields on the order of 30 gallons per minute [gpm] (Maxwell and Devaul, 1962). The Providence Limestone Member of the Shelburn Formation is reported to yield little to no water to wells. The lower Carbondale Formation, above and below the No. 9 coal seam, consists primarily of shales that reportedly yield little to no water to wells. Previous site-specific investigations, by others, have noted the presence of perched zones of saturation in the overlying unconsolidated materials.

3.1 Groundwater Monitoring System

Three temporary piezometers (P-10, P-11 and P-12) were installed adjacent to, and respectively; northwest, southwest and northeast of the Green CCR impoundment to determine the general direction of groundwater movement. Measured static water levels, from the highest to lowest elevation were observed in P-10 (highest), P-11 and P-12 (lowest) resulting in a calculated hydraulic gradient or apparent direction of groundwater movement is generally from northwest to southeast. This groundwater gradient characterization and the ability to locate monitoring wells specific to the CCR unit justify the placement of the minimum of one upgradient and three downgradient monitoring wells. The upgradient monitoring well (M-11) was installed adjacent to, and northwest of the impoundment. The downgradient monitoring wells (M-12, M-13 and M-14) were installed adjacent to, and respectively; south-southeast, southeast and east-northeast of the impoundment. All monitoring wells are completed in the stratigraphic interval described above. Approximate locations of the groundwater monitoring wells are shown on the Groundwater Monitoring Well Location Aerial Photo (**Attachment B**). Boring logs and well construction diagrams are presented as **Attachment C**.

3.2 Groundwater Flow

Water level data were collected from the unit during the nine baseline CCR monitoring events from March 2016 through October 2017as summarized on **Table 1** of **Attachment A**.

These data and the piezometric surface map presented below (**Figure 3**) represent general conditions at the Surface Impoundment and support the following analysis.

Overall groundwater flow beneath the footprint of the Green Surface Impoundment is to the east/southeast towards the Green River located east of the impoundment. The hydraulic gradients calculated from seasonal high, mid-point, and low events during the baseline period ranged from 0.0159 to 0.0283 towards the east/southeast as presented in **Table 2** of **Attachment A**.

Figure 3: Green Surface Impoundment - Piezometric Surface Map

4.0 UPPERMOST AQUIFER

The "uppermost aquifer" is defined by 40 CFR §257.40 as the geologic formation nearest the natural ground surface that is an aquifer, as well as lower aquifers that are hydraulically interconnected with this aquifer within the facility's property boundary. This definition includes a shallow, deep, perched, confined or unconfined aquifer, provided it yields usable water.

4.1 Aquifer Characteristics

Site-specific data pertaining to the aquifer characteristics beneath the Green Surface Impoundment were obtained prior to initiation of this CCR Program.

Available information pertaining to the sandstone units in the upper Carbondale Formation, identified as the uppermost aquifer beneath the Surface Impoundment, generally provide well yields of 500 gpd or greater with some reported yields on the order of 30 gpm (Maxwell and Devaul, 1962). The Providence Limestone Member of the Shelburn Formation is reported to yield little to no water to wells. The lower Carbondale Formation, above and below the No. 9 coal seam, consists primarily of shales that reportedly yield little to no water to wells. Previous site-specific investigations, by others, have noted the presence of perched zones of saturation in the overlying unconsolidated materials.

4.2 Placement Above the Uppermost Aquifer

Based on the available boring logs from the monitoring well system, the top of the upper Carbondale Formation (uppermost aquifer) is at an approximately elevation of 363 feet to the northwest (at MW-11), at 348 feet to the northeast (at MW-14), at 351 feet to the east (at MW-13), and not encountered to the southwest (at MW-12) of the Surface Impoundment. Illustrated well boring cross-sections are presented as **Attachment B**. Based on the interpreted top of the upper Carbondale Formation (uppermost aquifer), the base of the Surface Impoundment (360 feet) rests on or intercepts the uppermost aquifer within the northern most reaches of the Surface Impoundment and does not meet the 5-foot separation of the uppermost aquifer.

Groundwater data provided by BREC via baseline data collection from monitoring wells between March 2016 and October 2017 were used to interpret the elevations of the uppermost aquifer within the area of the Surface Impoundment. Seasonal measurements (April, June, August, October 2016, and January 2017) are presented within the Groundwater Elevation Summary located as **Attachment B**. Based on the cross sections presented in **Attachment B**, the potentiometric surface is approximately 5 feet (at MW-12) and 32 feet (at MW-11) above the lowest base of the Surface Impoundment (360 feet) and hydraulic connectivity cannot be disproven.

5.0 CONCLUSIONS

Available data regarding site groundwater, site geology, and physical limits of the unit for the Green Surface Impoundment do not evidence a 5-foot separation between the base of the impoundment and the uppermost limit of the uppermost aquifer and they do not support a lack of hydraulic connectivity between the unit and the aquifer as specified in 40 CFR §257.60(a). Therefore the unit does not meet the Placement above the Uppermost Aquifer requirement of 40 CFR §257.60(a).

6.0 REFERENCES

Burns and Roe, Inc., Engineering and Consultants, June 30, 1978, Site Grading Plans.

Fairer, G.M., Geologic Map of the Robards Quadrangle, Henderson and Webster Counties, Kentucky, U.S. Geological Survey, 1973.

Geotechnical and other information provided by Associated Engineers, Inc.

Engineering design drawings and other information provided by Big Rivers Electric Corporation.

Maxwell, B.W. and Devaul, R.W., Availability of Ground Water in Hopkins and Webster Counties, Kentucky, U.S. Geological Survey, 1962.

Murphy, 2007. Geological mapping.

United States Geological Survey U.S. Geological Survey (USGS) 7.5 minute Robards and Delaware topographic quadrangle maps

Attachments

Attachment A

Tables 1 and 2

TABLE 1

MONITORING WELL NETWORK GROUNDWATER ELEVATIONS - APRIL 2016 - OCTOBER 2017

BIG RIVERS ELECTRIC CORPORATION - SEBREE STATION
GREEN STATION SURFACE IMPOUNDMENT
WEBSTER COUNTY, KENTUCKY

	GROUNDWATER MONITORING WELL NETWORK							
	MW-11		MW-12		MW-13		MW-14	
Reference Elevation TOIC*(ft, NAD27)	**Upgradient/Background 401.32**		**Downgradient 395.54**		**Downgradient 394.60**		**Downgradient 390.71**	
Date Measured	**Depth to Water (ft) (feet)**	**GW Elevation (feet)**	**Depth to Water (ft) (feet)**	**GW Elevation (feet)**	**Depth to Water (ft) (feet)**	**GW Elevation (feet)**	**Depth to Water (ft) (feet)**	**GW Elevation (feet)**
4/1/2016	8.20	393.12	32.51	363.03	18.86	375.74	22.13	368.58
6/2/2016	8.32	393.00	29.62	365.92	18.83	375.77	23.01	367.7
8/16/2016	8.45	392.87	27.79	367.75	20.60	374	25.55	365.16
10/25/2016	9.06	392.26	29.57	365.97	20.30	374.3	26.52	364.19
1/26/2017	9.65	391.67						
1/27/2017			27.96	367.58	18.54	376.06	19.35	371.36
5/1/2017	10.12	391.20	26.93	368.61	19.23	375.37	24.01	366.7
8/11/2017	9.95	391.37	27.51	368.03	20.73	373.87	26.53	364.18
9/20/2017	9.97	391.35	32.20	363.34	20.68	373.92	26.03	364.68
10/9/2017	9.33	391.99	39.04	356.50	20.66	373.94	26.26	364.45

*Reference elevation of monitoring wells surveyed by Associated Engineers, Inc., Madisonville, Kentucky, January 2015
Survey coordinates were based on the Kentucky State Plane, Kentucky Southern Zone, NAD27 datum
TOIC = Top of internal casing
GW = Groundwater; GS = Ground Surface; NM = Not measured

TABLE 2

HYDRAULIC GRADIENT
GROUNDWATER MONITORING SYSTEM

BIG RIVERS ELECTRIC CORPORATION - SEBREE STATION
GREEN STATION SURFACE IMPOUNDMENT
WEBSTER COUNTY, KENTUCKY

	Well ID / GW Elevation (ft, NAD27)		Change in Head (feet)	Horizontal Distance* (feet)	Hydraulic Gradient
	MW-11	MW-12			
Apr 2016	393.12	363.03	30.09	1358	0.0222
Oct 2016	392.26	365.97	26.29	1358	0.0194
May 2017	391.20	368.61	22.59	1358	0.0166

	Well ID / GW Elevation (ft, NAD27)		Change in Head (feet)	Horizontal Distance* (feet)	Hydraulic Gradient
	MW-11	MW-13			
Apr 2016	393.12	375.74	17.38	996	0.0174
Oct 2016	392.26	374.30	17.96	996	0.0180
May 2017	391.20	375.37	15.83	996	0.0159

	Well ID / GW Elevation (ft, NAD27)		Change in Head (feet)	Horizontal Distance* (feet)	Hydraulic Gradient
	MW-11	MW-14			
Apr 2016	393.12	368.58	24.54	956	0.0257
Oct 2016	392.26	365.16	27.10	956	0.0283
May 2017	391.20	366.7	24.50	956	0.0256

*Reference elevation of monitoring wells surveyed by Associated Engineers, Inc., Madisonville, Kentucky, January 2015

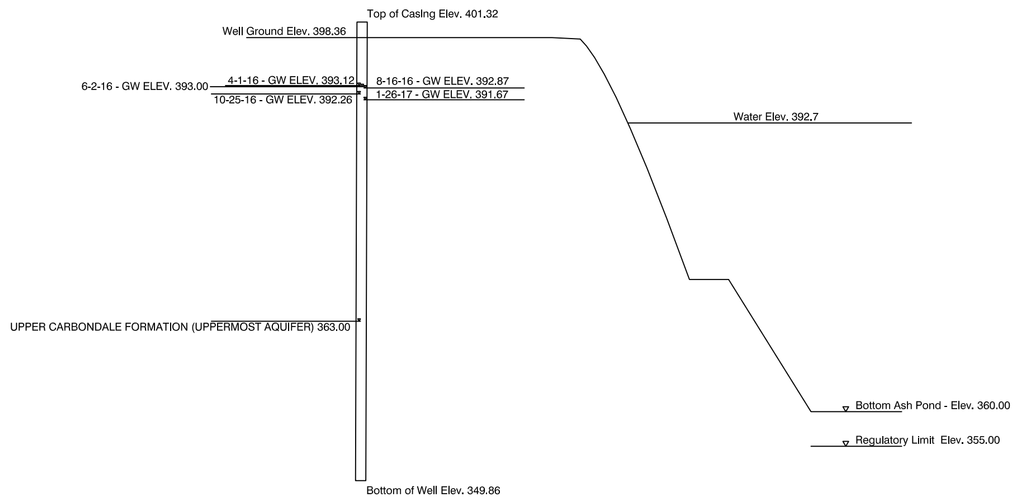
Survey coordinates were based on the Kentucky State Plane, Kentucky Southern Zone, NAD27 datum

*Horizontal distance between monitoring wells, parallel to the direction of groundwater flow (as determined by measurements utilizing Kentucky GIS)

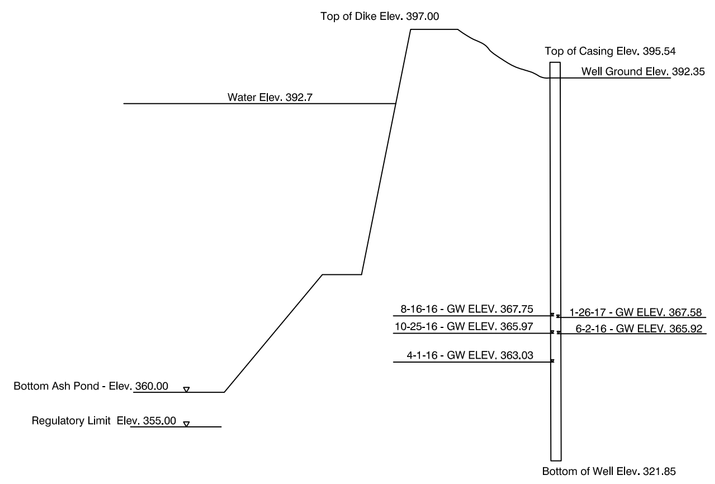
Attachment B

Groundwater Elevation Summary

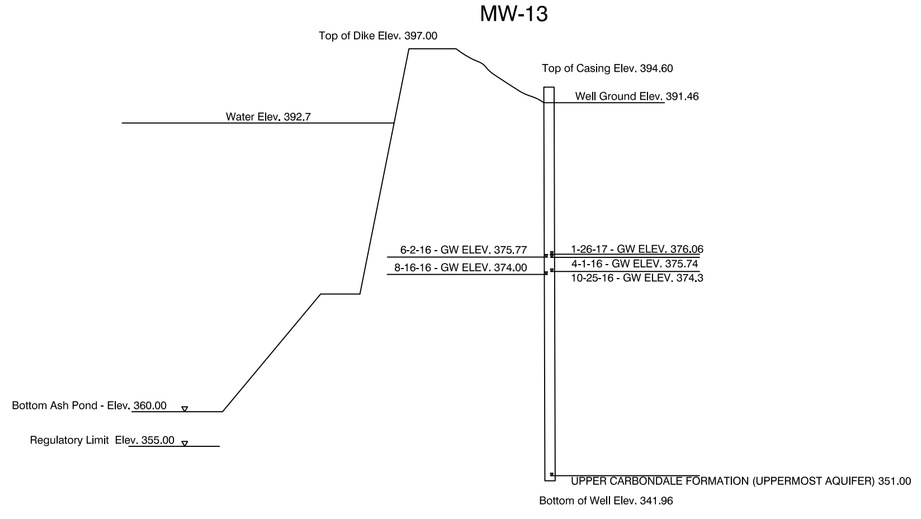
MW-11



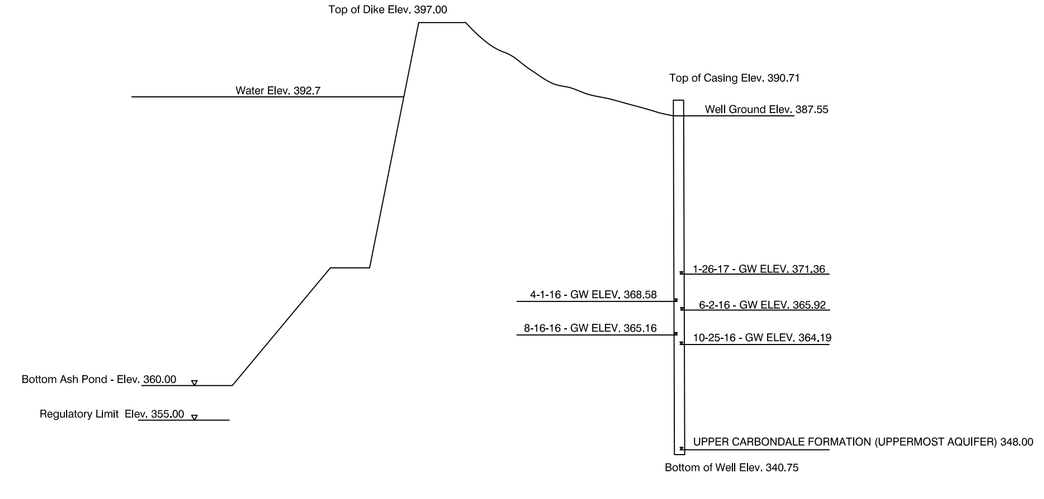
MW-12



MW-13



MW-14



GREEN COAL COMBUSTION RESIDUALS SURFACE IMPOUNDMENT GROUNDWATER ELEVATION SUMMARY

Monitoring Well ID	Well Ground Elevation (feet, NAD27)	Top of Well Casing Elevation (feet, NAD27)	Total Well Depth (feet, TOIC)	Bottom of Well Elevation (feet, NAD27)	Depth to Top of Screened Interval (feet, GS)	Top of Screened Elevation (feet, NAD27)	Depth to Bottom of Screened Interval (feet, GS)	Bottom of Screened Elevation (feet, NAD27)	Bottom of Ash Pond Elevation	Depth to Water (feet, TOIC)	GW Elevation (feet, NAD27)	Depth to Water (feet, TOIC)	GW Elevation (feet, NAD27)	Depth to Water (feet, TOIC)	GW Elevation (feet, NAD27)	Depth to Water (feet, TOIC)	GW Elevation (feet, NAD27)	Depth to Water (feet, TOIC)	GW Elevation (feet, NAD27)
										4/1/2016		6/2/2016		8/16/2016		10/25/2016		1/26/2017	
MW-11	398.36	401.32	51.5	349.86	43.5	354.86	48.5	349.86	360.0	8.20	393.12	8.32	393.00	8.45	392.87	9.06	392.26	9.65	391.67
MW-12	392.35	395.54	73.7	321.85	60.5	331.85	70.5	321.85		32.51	363.03	29.62	365.92	27.79	367.75	29.57	365.97	27.96	367.58
MW-13	391.46	394.60	52.6	341.96	44.5	346.96	49.5	341.96		18.86	375.74	18.83	375.77	20.60	374.00	20.30	374.3	18.54	376.06
MW-14	387.55	390.71	50.0	340.75	41.8	345.75	46.8	340.75		22.13	368.58	23.01	367.7	25.55	365.16	26.52	364.19	19.35	371.36

Attachment C

Boring Logs and Well Construction Diagrams

(23)

UNIFORM KENTUCKY WELL CONSTRUCTION RECORD

Use this form only to report installation of monitoring or water wells.
Original copy must be submitted to Division of Water within 60 days of completion.
See instructions on reverse of form.
Record must be typed or neatly printed or it will be returned to the driller as unacceptable.
One copy to Division of Water, one copy to owner, one copy to driller's files.

8006- 3938

4. Owner name: Big Rivers Electric Corporation
5. Owner address: 201 Third Street
6. City: Henderson
7. State: KY
8. Zip: 42420

If site name and address differ from owner name and address:

9. Site name: Sebree Station
10. Site address: 9000 Highway 2096
11. City: Robards
12. State: KY
13. Zip: 42452

1. Kentucky Well ID (AKGWA) Number: 8006 - 3938
2. Owner well ID#: MW-11

3. Attachments
Required
1. Site plan or sketch map [X]
2. Well location
On topographic map, **OR** [X]
Obtained by GPS unit [ ]
Conditionally Required
3. Well diagram (monitoring well) [X]
4. Coliform analysis (if applicable) [ ]
5. Signed Variance (if applicable) [X]
Optional
6. Other laboratory analysis report [ ]

14. Agency Interest (AI) Number: 4196
15. Facility type & ID Number: [ ] CERCLA [ ] RCRA [ ] Solid Waste [ ] UST [ ] Drinking Water [ ] Mining — CCR Rule

16. Owner phone: 270 - 844 - 6031
17. Site phone: 270 - 521 - 7927

23. Install start date: 12 (Month) 15 (Day) 15 (Year)
24. Install end date: 1 (Month) 7 (Day) 15 (Year)

18. USGS topo map: Robards
19. County: Webster
20. Physiographic Region: [ ] Blue Grass [ ] E. Coal Field [ ] Miss. Plateau [ ] Ohio River Alluvium [X] W. Coal Field [ ] Jackson Purchase
21. Surface elevation (ft): 398.36
22. Elevation determined by: [ ] GPS [ ] Map [ ] Prior report [X] Survey [ ] Prior well log

Please report depths in feet below ground surface, not as relative elevations.
25. Total depth: 49.9
26. Depth to bedrock: 21.3
27. Static water level: 5.24
28. Casing height above surface (in): 35.52

29. Well use: [ ] Agriculture [ ] Commercial [ ] Domestic [ ] Industrial [X] Monitoring / Remed 01 [ ] Public [ ] Geothermal [ ] Heat pump [ ] HVAC [ ] Injection [ ] Mining [ ] Unused
NOTE: CODE REQUIRED for most well uses. See back of form for codes.

30. Drilling method: [ ] Auger – HS [ ] Auger – SS [ ] Auger – bucket [ ] Auger – hand [ ] Cable tool [ ] Core [ ] Driven Casing [ ] Excavation [ ] Jet wash [ ] Push/probe [ ] Rotary – air [ ] Rotary – mud [ ] Rotary – reverse [ ] Sand point [ ] Sonic [ ] Unknown [X] Combined – HS auger and air rotary [ ] Combined – other (specify):

31. Well status: [X] Active [ ] Inactive [ ] Unsuitable for intended use

32. Wellhead: [ ] Flush [ ] Well cap [X] Locking [ ] Sanitary seal

33. Well development method: [ ] Surging [ ] Jetting [ ] Pumping [ ] Backwashing [ ] Bailing [ ] Compressed air [X] Combination of methods (specify): Air-lift pump and water flush

WATER WELLS ONLY
34. Estimated well yield: [ ] gpm [ ] gph [ ] gpd
35. Well service: #of people served
36. Disinfectant amount: [ ] oz [ ] qt [ ] cups [ ] lb [ ] gal
37. Type: [ ] Bleach [ ] Hypo-chlorite
38. Pitless adapter installed: [ ] Yes [ ] No
39. Pump installed: [ ] Submersible [ ] Jet [ ] Bailer or bucket [ ] Turbine [ ] Hand [ ] No pump
40. Depth to intake (ft):
41. Apparent quality and odor
APPEARANCE: [ ] Clear [ ] Cloudy [ ] Muddy [ ] Turbid
ODOR: none / slight / mod. / high — [ ] Iron [ ] Sulfur [ ] Salt

COLIFORM TEST
42. Coliform test type: [ ] fecal [ ] fecal and total
43. Coliform test results: [ ] 0 or <1.0 [ ] TNTC [ ] Confluent or # colonies per 100 mL
44. Date sampled: Month Day Year
45. Date analyzed:

46. Well completion: Casing and screens

From depth (feet)	To depth (feet)	Borehole diameter (inches)	Casing diam (in) ID	Casing diam (in) OD	Casing type	Screen slot size
0.0	22.3	10.5	2.0	2.38	Sch 40 PVC	
22.3	43.5	6.5	2.0	2.38	Sch 40 PVC	
43.5	48.5	6.5	2.0	2.38	Sch 40 Screen	0.010

47. Annulus fill and seal

From depth (feet)	To depth (feet)	Material (NOTE for WATER WELLS only: If cuttings (clay, shale or limestone only) are used, you must specify composition.)
0.0	2.0	Concrete
2.0	39.5	Cement grout
39.5	41.5	Bentonite pellets
41.5	49.9	Silica sand

48. Lithologic log (if more space is needed, continue on separate page)

From depth (ft)	To depth (ft)	Description (include any show of water and indicate apparent quality)
		See attachment

49. Sketch map: See attachment

50. Comments
4 1/4" ID HSA followed by 10 1/2" drag bit advanced to 22.3'. 8" ID PVC casing set to 22.3'. 6 1/2" tricone bit advanced to 49.9'. Silica sand set 48.5-49.9'. 2" casing and screen set. Sand set 41.5'-49.9'. Bentonite pellets set 39.5'-41.5'. After minimum 8 hour hydration time, cement grout set 22.3'-39.5' using tremie method. 8" casing pulled and grouting continued to 2'. Protective surface casing and pad installed after grout cured.

Latitude: 37.642616
Longitude: -87.503252
Lat/Long Method: [ ] INT [ ] GPS [X] SUR [ ] REP

51. Affirmation: The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.
Note: the driller is not responsible for natural groundwater quality or quantity encountered while drilling or completing this well.

Signature of certified driller: [signature] Date signed: 5/25/16
Certification number: 0219-0364-00
Drilling company: Associated Engineers, Inc.
Date Received: 5/27/16

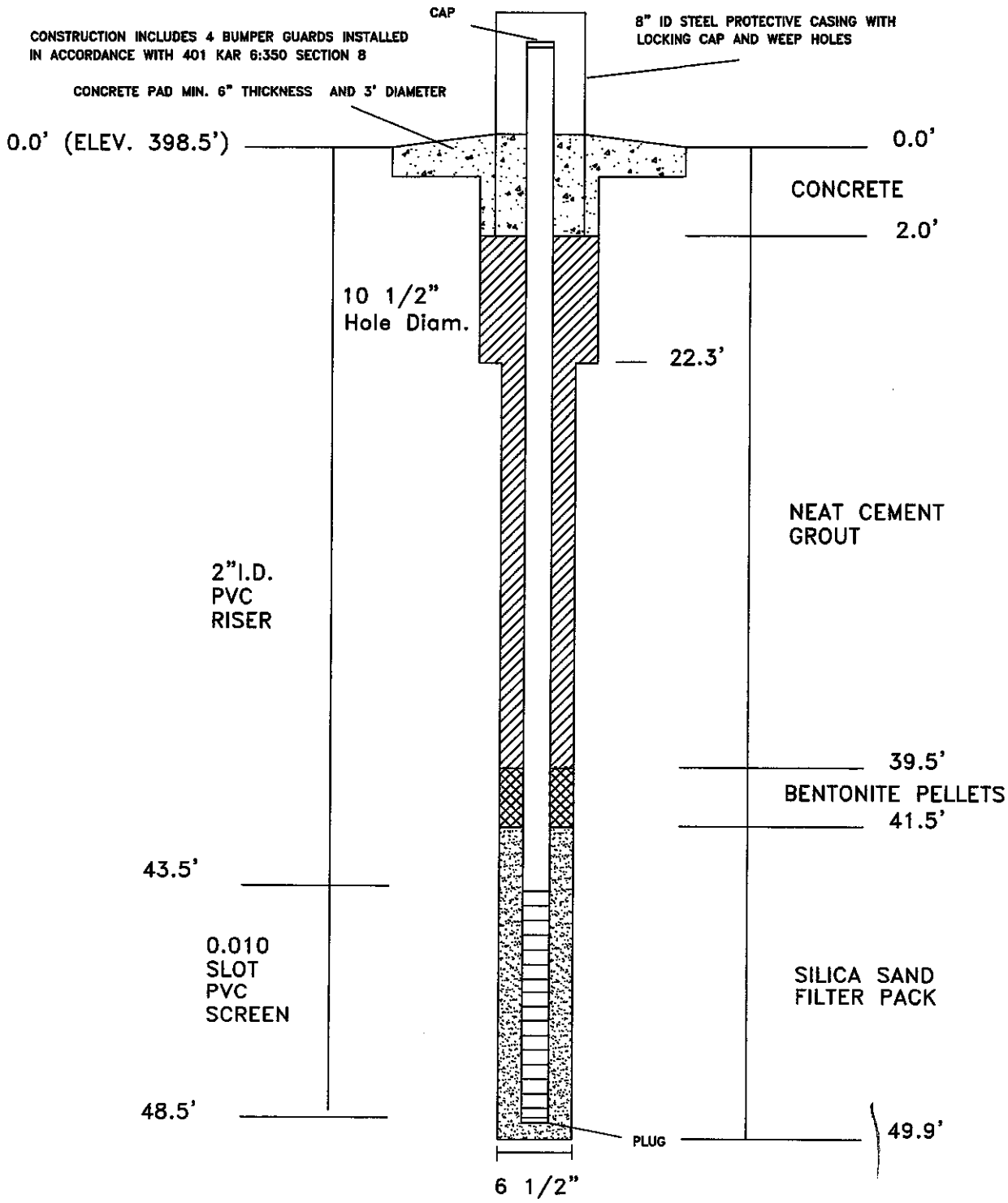
rev 02/29/2012

ce 7/25/16

48. Lithologic Log MW-11

From depth (ft)	To depth (ft)	Description
0.0	0.3	Ash
0.3	2.0	Silty clay light brown
2.0	3.1	Silty clay brown
3.1	4.0	Silty clay light gray
4.0	6.7	Silty clay gray moist
6.7	15.0	Silty clay yellowish brown moist
15.0	21.3	Silty clay w/weathered shale light gray
21.3	22.3	Sandy shale light gray soft
	22.3	Auger refusal
22.3	33.0	Sandy shale gray
33.0	35.9	Claystone
35.9	40.4	Sandstone gray
40.4	41.5	Claystone
41.5	44.3	Sandstone gray water
44.3	45.1	Shale gray
45.1	49.9	Sandstone with carbonaceous strks gray water
	49.9	TD

MONITORING WELL 8006-3938
(MW-11)



BIG RIVERS ELECTRIC CORPORATION	Job Number:	15-0140G	Revisions:
	Date:	12/24/15	
Well Construction Diagram	Scale:	No Scale	
	Drawn By:	D. Dunbar	

ASSOCIATED ENGINEERS, INC.
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Phone: (270) 821-7732 · Fax: (270) 821-7789
www.associatedengineers.com

(23)

UNIFORM KENTUCKY WELL CONSTRUCTION RECORD

Use this form only to report installation of monitoring or water wells.
Original copy must be submitted to Division of Water within 60 days of completion.
See instructions on reverse of form.
Record must be typed or neatly printed or it will be returned to the driller as unacceptable.
One copy to Division of Water, one copy to owner, one copy to driller's files.

8006- 3939

4. Owner name Big Rivers Electric Corporation

5. Owner address 201 Third Street

6. City Henderson **7. State** KY **8. Zip** 42420

If site name and address differ from owner name and address:

9. Site name Sebree Station

10. Site address 9000 Highway 2096

11. City Robards **12. State** KY **13. Zip** 42452

1. Kentucky Well ID (AKGWA) Number 8006 - 3939

2. Owner well ID# MW-12

3. Attachments
Required
1. Site plan or sketch map [X]
2. Well location
On topographic map, **OR** [X]
Obtained by GPS unit [ ]
Conditionally Required
3. Well diagram (monitoring well) [X]
4. Coliform analysis (if applicable) [ ]
5. Signed Variance (if applicable) [X]
Optional
6. Other laboratory analysis report [ ]

14. Agency Interest (AI) Number 4196

15. Facility type & ID Number [ ] CERCLA [ ] RCRA [ ] Solid Waste [ ] UST [ ] Drinking Water [ ] Mining — CCR Rule

16. Owner phone 270 - 844 - 6031

17. Site phone 270 - 521 - 7927

18. USGS topo map Robards

19. County Webster

20. Physiographic Region [ ] Blue Grass [ ] E. Coal Field [ ] Miss. Plateau [ ] Ohio River Alluvium [X] W. Coal Field [ ] Jackson Purchase

21. Surface elevation (ft) 392.35

22. Elevation determined by [ ] GPS [ ] Map [ ] Prior report [X] Survey [ ] Prior well log

23. Install start date 01 (Month) 05 (Day) 16 (Year)

24. Install end date 01 (Month) 14 (Day) 16 (Year)

Please report depths in feet below ground surface, not as relative elevations.

25. Total depth 72.0

26. Depth to bedrock 55.0

27. Static water level 29.32

28. Casing height above surface (in) 38.28

29. Well use
[ ] Agriculture
[ ] Commercial
[ ] Domestic
[ ] Industrial
[X] Monitoring / Remed 01
[ ] Public
[ ] Geothermal
[ ] Heat pump
[ ] HVAC
[ ] Injection
[ ] Mining
[ ] Unused

NOTE: CODE REQUIRED for most well uses.
See back of form for codes.

30. Drilling method
[ ] Auger – HS
[ ] Auger – SS
[ ] Auger – bucket
[ ] Auger – hand
[ ] Cable tool
[ ] Core
[ ] Driven Casing
[ ] Excavation
[ ] Jet wash
[ ] Push/probe
[ ] Rotary – air
[ ] Rotary – mud
[ ] Rotary – reverse
[ ] Sand point
[ ] Sonic
[ ] Unknown
[X] Combined – HS auger and air rotary
[ ] Combined – other (specify):

31. Well status
[X] Active [ ] Inactive
[ ] Unsuitable for intended use

32. Wellhead
[ ] Flush [ ] Well cap
[X] Locking [ ] Sanitary seal

33. Well development method
[ ] Surging [ ] Jetting
[ ] Pumping [ ] Backwashing
[ ] Bailing [ ] Compressed air
[X] Combination of methods (specify):
Air-lift pump and water flush

46. Well completion: Casing and screens

From depth (feet)	To depth (feet)	Borehole diameter (inches)	Casing diam (in) ID	Casing diam (in) OD	Casing type	Screen slot size
0.0	56.5	10.5	2.0	2.38	Sch 40 PVC	
56.5	60.5	6.5	2.0	2.38	Sch 40 PVC	
60.5	70.5	6.5	2.0	2.38	Sch 40 Screen	0.010

47. Annulus fill and seal

From depth (feet)	To depth (feet)	Material (NOTE for WATER WELLS only: If cuttings (clay, shale or limestone only) are used, you must specify composition.)
0.0	2.0	Concrete
2.0	56.5	Cement grout
56.5	58.5	Bentonite pellets
58.5	72.0	Silica sand

48. Lithologic log (if more space is needed, continue on separate page)

From depth (ft)	To depth (ft)	Description (include any show of water and indicate apparent quality)
		See attachment

49. Sketch map

See attachment

WATER WELLS ONLY

34. Estimated well yield • [ ] gpm [ ] gph [ ] gpd

35. Well service #of people served

36. Disinfectant amount • [ ] oz [ ] qt [ ] cups [ ] lb [ ] gal

37. Type [ ] Bleach [ ] Hypo-chlorite

38. Pitless adapter installed [ ] Yes [ ] No

39. Pump installed: [ ] Submersible [ ] Jet [ ] Bailer or bucket [ ] Turbine [ ] Hand [ ] No pump

40. Depth to intake (ft) •

41. Apparent quality and odor
APPEARANCE: [ ] Clear [ ] Cloudy [ ] Muddy [ ] Turbid
ODOR (none / slight / mod. / high): [ ] Iron [ ] Sulfur [ ] Salt

COLIFORM TEST

42. Coliform test type [ ] fecal [ ] fecal and total

43. Coliform test results [ ] 0 or <1.0 [ ] TNTC [ ] Confluent
or # colonies per 100 mL

44. Date sampled Month Day Year

45. Date analyzed

50. Comments
4 1/4" ID HSA followed by 10 1/2" drag bit advanced to 56.5'. 8" ID PVC casing set to 56.5'. 6 1/2" tricone bit advanced to 72.0'. Silica sand set 70.5'-72.0'. 2" casing and screen set. Sand set 58.5'-70.5'. Bentonite pellets set 58.5'-60.5'. After minimum 8 hour hydration time unable to pull 8" casing due to soil squeeze. Remaining annulus grouted with cement using tremie method. Protective surface casing and pad installed after grout cured.

Latitude 37.639148

Longitude -87.501824

51. Affirmation: The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.
Note: the driller is not responsible for natural groundwater quality or quantity encountered while drilling or completing this well.

Signature of certified driller [signature] **Date signed** 5/25/16

Certification number 0219-0364-00

Drilling company Associated Engineers, Inc.

Lat/Long Method [ ] INT [ ] GPS [X] SUR [ ] REP

Date Received 5/27/16

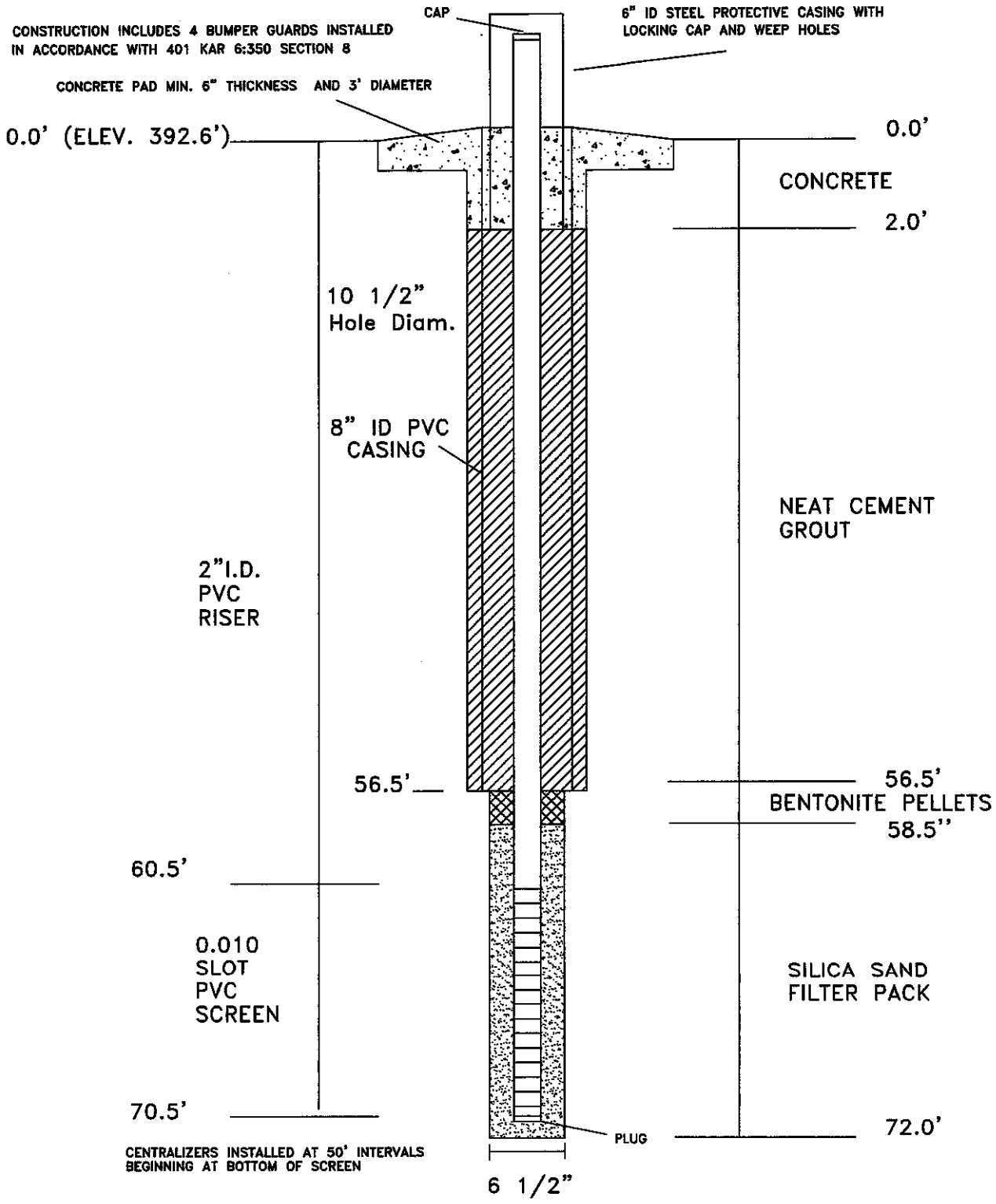
rev 02/29/2012

ce 7/25/16

48. Lithologic Log MW-12

From depth (ft)	To depth (ft)	Description
0.0	4.0	Silty clay brown fill
4.0	12.6	Ash gray wet fill
12.6	13.6	Clay gray wet
13.6	21.2	Silty clay yellowish brown very moist
21.2	23.0	Silty clay yellowish brown very moist
23.0	31.5	Silty clay yellowish brown very moist
31.5	37.0	Silty clay brown, moist
37.0	40.5	Silty clay yellowish brown moist
40.5	52.0	Silty clay brown moist
52.0	55.0	Silty clay brown very moist
55.0	56.5	Shale gray soft
56.5	63.0	Shale gray
63.0	63.6	Shale and interbedded sandstone gray
63.6	72.0	Shale gray
	72.0	TD

MONITORING WELL 8006-3939
(MW-12)



BIG RIVERS ELECTRIC CORPORATION			
Well Construction Diagram	Job Number:	150140G	Revisions:
	Date:	1/13/16	
	Scale:	No Scale	
	Drawn By:	D. Dunbar	

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(23)

UNIFORM KENTUCKY WELL CONSTRUCTION RECORD

Use this form only to report installation of monitoring or water wells.
Original copy must be submitted to Division of Water within 60 days of completion.
See instructions on reverse of form.
Record must be typed or neatly printed or it will be returned to the driller as unacceptable.
One copy to Division of Water, one copy to owner, one copy to driller's files.

8006- 3940

4. Owner name Big Rivers Electric Corporation

5. Owner address 201 Third Street

6. City Henderson **7. State** KY **8. Zip** 42420

If site name and address differ from owner name and address:

9. Site name Sebree Station

10. Site address 9000 Highway 2096

11. City Robards **12. State** KY **13. Zip** 42452

14. Agency Interest (AI) Number 4196

15. Facility type & ID Number ☐ CERCLA ☐ RCRA ☐ Solid Waste ☐ UST ☐ Drinking Water ☐ Mining — CCR Rule

16. Owner phone 270 - 844 - 6031 **17. Site phone** 270 - 521 - 7927

18. USGS topo map Robards

19. County Webster

20. Physiographic Region ☐ Blue Grass ☐ E. Coal Field ☐ Miss. Plateau ☐ Ohio River Alluvium ☒ W. Coal Field ☐ Jackson Purchase

21. Surface elevation (ft) 391.46

22. Elevation determined by ☐ GPS ☐ Map ☐ Prior report ☒ Survey ☐ Prior well log

1. Kentucky Well ID (AKGWA) Number 8006 - 3940

2. Owner well ID# MW-13

3. Attachments

Required
1. Site plan or sketch map ☒
2. Well location
   On topographic map, **OR** ☒
   Obtained by GPS unit ☐

Conditionally Required
3. Well diagram (monitoring well) ☒
4. Coliform analysis (if applicable) ☐
5. Signed Variance (if applicable) ☒

Optional
6. Other laboratory analysis report ☐

23. Install start date 12 (Month) 28 (Day) 15 (Year)

24. Install end date 1 (Month) 11 (Day) 15 (Year)

Please report depths in feet below ground surface, not as relative elevations.

25. Total depth 51.5

26. Depth to bedrock 39.5

27. Static water level 15.52

28. Casing height above surface (in) 37.68

29. Well use
☐ Agriculture ☐ Commercial ☐ Domestic ☐ Industrial ☒ Monitoring / Remed 01 ☐ Public ☐ Geothermal ☐ Heat pump ☐ HVAC ☐ Injection ☐ Mining ☐ Unused

NOTE: CODE REQUIRED for most well uses.
See back of form for codes.

30. Drilling method
☐ Auger – HS ☐ Auger – SS ☐ Auger – bucket ☐ Auger – hand ☐ Cable tool ☐ Core ☐ Driven Casing ☐ Excavation ☐ Jet wash ☐ Push/probe ☐ Rotary – air ☐ Rotary – mud ☐ Rotary – reverse ☐ Sand point ☐ Sonic ☐ Unknown
☒ Combined – HS auger and air rotary
☐ Combined – other (specify):

31. Well status
☒ Active ☐ Inactive ☐ Unsuitable for intended use

32. Wellhead
☐ Flush ☐ Well cap ☒ Locking ☐ Sanitary seal

33. Well development method
☐ Surging ☐ Jetting ☐ Pumping ☐ Backwashing ☐ Bailing ☐ Compressed air
☒ Combination of methods (specify):
Air-lift pump and water flush

WATER WELLS ONLY

34. Estimated well yield • ☐ gpm ☐ gph ☐ gpd

35. Well service #of people served

36. Disinfectant amount • ☐ oz ☐ qt ☐ cups ☐ lb ☐ gal

37. Type ☐ Bleach ☐ Hypo-chlorite

38. Pitless adapter installed ☐ Yes ☐ No

39. Pump installed: ☐ Submersible ☐ Jet ☐ Bailer or bucket ☐ Turbine ☐ Hand ☐ No pump

40. Depth to intake (ft) •

41. Apparent quality and odor

APPEARANCE: ☐ Clear ☐ Cloudy ☐ Muddy ☐ Turbid

ODOR	none	slight	mod.	high
Iron	☐	☐	☐	☐
Sulfur	☐	☐	☐	☐
Salt	☐	☐	☐	☐

COLIFORM TEST

42. Coliform test type ☐ fecal ☐ fecal and total

43. Coliform test results ☐ 0 or <1.0 ☐ TNTC ☐ Confluent

or # colonies per 100 mL

44. Date sampled Month Day Year

45. Date analyzed

46. Well completion: Casing and screens

From depth (feet)	To depth (feet)	Borehole diameter (inches)	Casing diam (in) ID	Casing diam (in) OD	Casing type	Screen slot size
0.0	40.5	10.5	2.0	2.38	Sch 40 PVC	
40.5	44.5	6.5	2.0	2.38	Sch 40 PVC	
44.5	49.5	6.5	2.0	2.38	Sch 40 Screen	0.010

47. Annulus fill and seal

From depth (feet)	To depth (feet)	Material (NOTE for WATER WELLS only: If cuttings (clay, shale or limestone only) are used, you must specify composition.)
0.0	2.0	Concrete
2.0	40.5	Cement grout
40.5	42.5	Bentonite pellets
42.5	51.5	Silica sand

48. Lithologic log (if more space is needed, continue on separate page)

From depth (ft)	To depth (ft)	Description (include any show of water and indicate apparent quality)
		See attachment

49. Sketch map

See attachment

50. Comments

4 1/4" ID HSA followed by 10 1/2" drag bit advanced to 40.5'. 8" ID PVC casing set to 40.5'. 6 1/2" tricone bit advanced to 51.5'. Silica sand set 49.5-51.5'. 2" casing and screen set. Sand placed 42.5'-49.5'. Bentonite pellets set 40.5'-42.5'. 8" casing pulled after minimum 8 hour hydration time. Hole grouted 2'-40.5'. Protective surface casing and pad installed after grout cured.

Latitude 37.640856

Longitude -87.500722

Lat/Long Method ☐ INT ☐ GPS ☒ SUR ☐ REP

Date Received 5/27/16

51. Affirmation: The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.
Note: the driller is not responsible for natural groundwater quality or quantity encountered while drilling or completing this well.

Signature of certified driller [signature] **Date signed** 5/25/16

Certification number 0219-0364-00

Drilling company Associated Engineers, Inc.

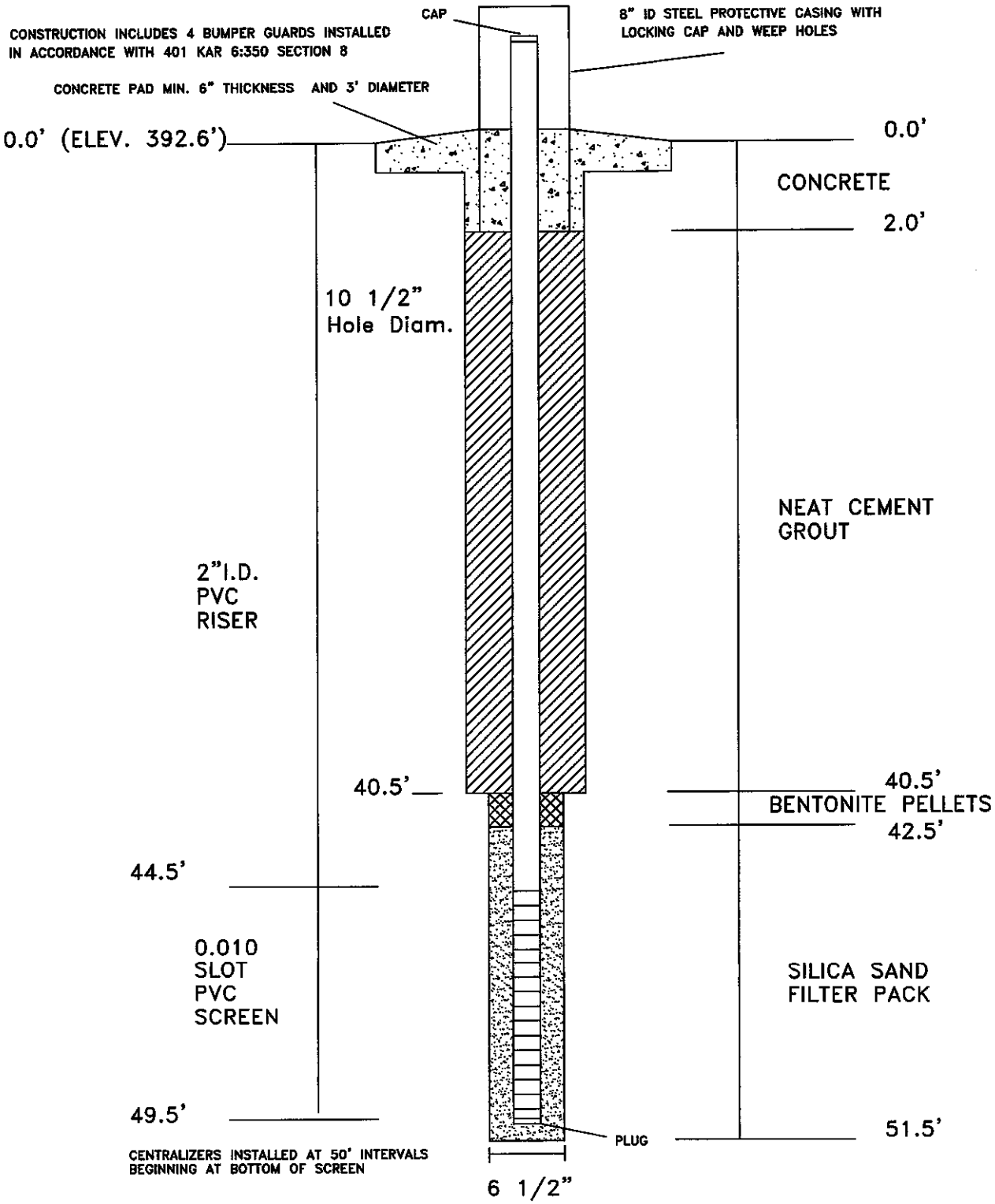
rev 02/29/2012

ce 7/25/16

48. Lithologic Log MW-13

From depth (ft)	To depth (ft)	Description
0.0	1.0	Ash black
1.0	2.7	Silty clay gray
2.7	10.6	Silty clay yellowish brown
10.6	12.8	Silty clay light gray
12.8	23.5	Silty clay yellowish brown wet
23.5	34.2	Silty clay brown very moist
34.2	39.5	Silty clay yellowish brown very moist
39.5	40.5	Sandstone yellowish brown soft weathered
	40.5	Auger refusal
40.5	50.4	Sandstone yellowish brown soft weathered
50.4	51.1	Shale gray
51.1	51.5	Sandy shale gray
	51.5	TD

MONITORING WELL 8006-3940
(MW-13)



BIG RIVERS ELECTRIC CORPORATION	Job Number:	150140G	Revisions:
	Date:	1/13/16	
Well Construction Diagram	Scale:	No Scale	
	Drawn By:	D. Dunbar	

ASSOCIATED ENGINEERS, INC.

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(23)

UNIFORM KENTUCKY WELL CONSTRUCTION RECORD

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Original copy must be submitted to Division of Water within 60 days of completion.
See instructions on reverse of form.
Record must be typed or neatly printed or it will be returned to the driller as unacceptable.
One copy to Division of Water, one copy to owner, one copy to driller's files.

8006- 3941

1. Kentucky Well ID (AKGWA) Number 8006 - 3941

2. Owner well ID# MW-14

3. Attachments
Required
1. Site plan or sketch map [X]
2. Well location
On topographic map, **OR** [X]
Obtained by GPS unit [ ]
Conditionally Required
3. Well diagram (monitoring well) [X]
4. Coliform analysis (if applicable) [ ]
5. Signed Variance (if applicable) [X]
Optional
6. Other laboratory analysis report [ ]

4. Owner name Big Rivers Electric Corporation

5. Owner address 201 Third Street

6. City Henderson **7. State** KY **8. Zip** 42420

If site name and address differ from owner name and address:

9. Site name Sebree Station

10. Site address 9000 Highway 2096

11. City Robards **12. State** KY **13. Zip** 42452

14. Agency Interest (AI) Number 4196

15. Facility type & ID Number [ ] CERCLA [ ] Solid Waste [ ] Drinking Water [ ] RCRA [ ] UST [ ] Mining — CCR Rule

16. Owner phone 270 - 844 - 6031

17. Site phone 270 - 521 - 7927

18. USGS topo map Robards

19. County Webster

20. Physiographic Region [ ] Blue Grass [ ] Ohio River Alluvium [ ] E. Coal Field [X] W. Coal Field [ ] Miss. Plateau [ ] Jackson Purchase

21. Surface elevation (ft) 387.55

22. Elevation determined by [ ] GPS [ ] Map [ ] Prior report [X] Survey [ ] Prior well log

23. Install start date 12 (Month) 21 (Day) 15 (Year)

24. Install end date 1 (Month) 7 (Day) 15 (Year)

Please report depths in feet below ground surface, not as relative elevations.

25. Total depth 49.6

26. Depth to bedrock 21.9

27. Static water level 18.97

28. Casing height above surface (in) 37.92

29. Well use
[ ] Agriculture [ ] Geothermal
[ ] Commercial [ ] Heat pump
[ ] Domestic [ ] HVAC
[ ] Industrial [ ] Injection
[X] Monitoring / Remed 01 [ ] Mining
[ ] Public [ ] Unused

NOTE: CODE REQUIRED for most well uses.
See back of form for codes.

30. Drilling method
[ ] Auger – HS [ ] Jet wash
[ ] Auger – SS [ ] Push/probe
[ ] Auger – bucket [ ] Rotary – air
[ ] Auger – hand [ ] Rotary – mud
[ ] Cable tool [ ] Rotary – reverse
[ ] Core [ ] Sand point
[ ] Driven Casing [ ] Sonic
[ ] Excavation [ ] Unknown
[X] Combined – HS auger and air rotary
[ ] Combined – other (specify):

31. Well status
[X] Active [ ] Inactive
[ ] Unsuitable for intended use

32. Wellhead
[ ] Flush [ ] Well cap
[X] Locking [ ] Sanitary seal

33. Well development method
[ ] Surging [ ] Jetting
[ ] Pumping [ ] Backwashing
[ ] Bailing [ ] Compressed air
[X] Combination of methods (specify):
Air-lift pump and water flush

46. Well completion: Casing and screens

From depth (feet)	To depth (feet)	Borehole diameter (inches)	Casing diam (in) ID	Casing diam (in) OD	Casing type	Screen slot size
0.0	24.7	10.5	2.0	2.38	Sch 40 PVC	
24.7	41.8	6.5	2.0	2.38	Sch 40 PVC	
41.8	46.8	6.5	2.0	2.38	Sch 40 Screen	0.010

47. Annulus fill and seal

From depth (feet)	To depth (feet)	Material (NOTE for WATER WELLS only: If cuttings (clay, shale or limestone only) are used, you must specify composition.)
0.0	2.0	Concrete
2.0	37.8	Cement grout
37.8	39.8	Bentonite pellets
39.8	49.6	Silica sand

48. Lithologic log (if more space is needed, continue on separate page)

From depth (ft)	To depth (ft)	Description (include any show of water and indicate apparent quality)
		See attachment

49. Sketch map

See attachment

WATER WELLS ONLY

34. Estimated well yield • [ ] gpm [ ] gph [ ] gpd

35. Well service #of people served

36. Disinfectant amount • [ ] oz [ ] qt [ ] cups [ ] lb [ ] gal

37. Type [ ] Bleach [ ] Hypo-chlorite

38. Pitless adapter installed [ ] Yes [ ] No

39. Pump installed: [ ] Submersible [ ] Jet [ ] Bailer or bucket [ ] Turbine [ ] Hand [ ] No pump

40. Depth to intake (ft) •

41. Apparent quality and odor

APPEARANCE: [ ] Clear [ ] Cloudy [ ] Muddy [ ] Turbid

ODOR	none	slight	mod.	high
Iron	[ ]	[ ]	[ ]	[ ]
Sulfur	[ ]	[ ]	[ ]	[ ]
Salt	[ ]	[ ]	[ ]	[ ]

COLIFORM TEST

42. Coliform test type [ ] fecal [ ] fecal and total

43. Coliform test results [ ] 0 or <1.0 [ ] TNTC [ ] Confluent

or # colonies per 100 mL

44. Date sampled Month Day Year

45. Date analyzed

50. Comments
4 1/4" ID HSA followed by 10 1/2" drag bit advanced to 24.7'. 8" ID PVC casing set to 24.7'. 6 1/2" tricone bit advanced to 49.6'. Silica sand set 46.8-49.6'. 2" casing and screen set. Sand set 39.8-46.8'. Bentonite pellets set 37.8-39.8'. After minimum 8 hour hydration time, cement grout set 24.7'-37.8' using tremie method. 8" casing pulled and grouting continued to 2'. Protective surface casing and pad installed after grout cured.

Latitude 37.642198

Longitude -87.500009

51. Affirmation: The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.
Note: the driller is not responsible for natural groundwater quality or quantity encountered while drilling or completing this well.

Signature of certified driller [signature] **Date signed** 5/25/16

Certification number 0219-0364-00

Drilling company Associated Engineers, Inc.

Lat/Long Method [ ] INT [ ] GPS [X] SUR [ ] REP

Date Received 5/27/16

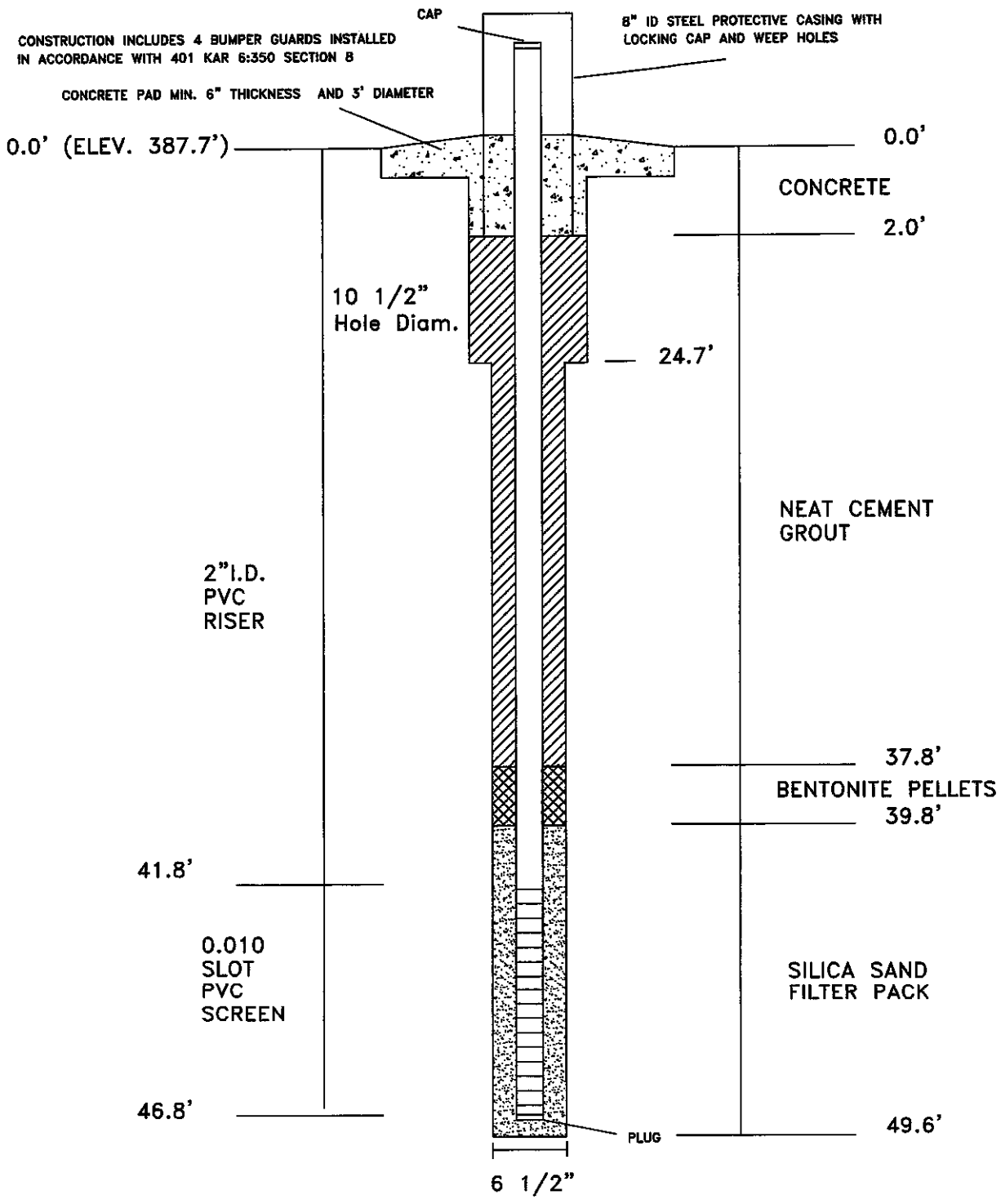
rev 02/29/2012

Ck 7/5/16

48. Lithologic Log MW-14

From depth (ft)	To depth (ft)	Description
0.0	2.4	Ash black
2.4	3.8	Silty clay yellowish brown
3.8	11.2	Silty clay brown
11.2	16.9	Silty clay yellowish brown w/sandstone fragments
16.9	21.9	Sandstone yellowish brown soft weathered
21.9	24.7	Shale gray soft
	24.7	Auger refusal
24.7	26.5	Shale gray soft
26.5	39.8	Sandy shale gray
39.8	48.3	Sandstone gray, water
48.3	49.1	Shale and interbedded sandstone gray
49.1	49.3	Sandstone gray
49.3	49.6	Shale gray
	49.6	TD

MONITORING WELL 8006-3941
(MW-14)



BIG RIVERS ELECTRIC CORPORATION	Job Number:	15-0140G	Revisions:
	Date:	1/13/16	
Well Construction Diagram	Scale:	No Scale	
	Drawn By:	D. Dunbar	

ASSOCIATED ENGINEERS, INC.

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502-569-2304 fax

AECOM

October 17, 2018

Big Rivers Electric Corporation
Sebree Generating Station
9000 Highway 2096
Robards, Kentucky 42452

Engineer's Certification of Placement Above the Uppermost Aquifer Demonstration
Existing Reid/HMPL CCR Surface Impoundment
EPA Final CCR Rule
Sebree Station
Robards, Kentucky

1.0 PURPOSE

The purpose of this document is to certify that the Placement above Sebree "Reid/HMPL" Existing CCR Surface Impoundment is in compliance with the Placement above the Uppermost Aquifer requirement of the Final CCR Rule at 40 CFR §257.60. Presented below is the project background, summary of findings, limitations and certification.

2.0 BACKGROUND

In accordance with 40 CFR §257.60, the owner/operator of an existing CCR Surface Impoundment must demonstrate that the base of the unit is located no less than 1.52 meters (five feet) above the upper limit of the uppermost aquifer, or must demonstrate that there will not be an intermittent, recurring, or sustained hydraulic connection between any portion of the base of the CCR unit and the uppermost aquifer due to normal fluctuations in groundwater elevations (including the seasonal high water table). In accordance with 40 CFR §257.60(c)(1), the demonstration must be made by October 17, 2018. If such demonstration cannot be made, the unit is subject to the closure or retrofit requirements of 40 CFR §257.101

3.0 SUMMARY OF FINDINGS

Available data regarding site groundwater, site geology, and physical limits of the unit for the Reid/HMPL Surface Impoundment do not evidence a 5-foot separation between the base of the impoundment and the upper most limit of the uppermost aquifer and they do not support a lack of hydraulic connectivity between the unit and the aquifer as specified in 40 CFR §257.60(a). Therefore the unit does not meet the Placement above the Uppermost Aquifer requirement of 40 CFR §257.60(a).

AECOM

4.0 CERTIFICATION

I, Michael Brian Cole, being a Registered Professional Engineer in good standing in the State of Kentucky, do hereby certify, to the best of my knowledge, information, and belief that the information contained in this certification has been prepared in accordance with the accepted practice of engineering. I certify, for the above-referenced CCR Unit, that the available data do not support a demonstration of Placement above the Uppermost Aquifer that meets the requirements of 40 CFR § 257.60(a).

M. Brian Cole
Printed Name

October 17, 2018
Date

ADDRESS: AECOM
500 W Jefferson St Suite 1600
Louisville, KY 40202

TELEPHONE: (502)-569-2301

ATTACHMENTS: Placement above the Uppermost Aquifer Demonstration for Coal Combustion Residuals

Big Rivers ELECTRIC CORPORATION

Your Touchstone Energy® Cooperative

Existing "Reid/HMPL" CCR Surface Impoundment

Disposal of Coal Combustion Residuals (CCR) from Electric Utilites Final Rule

Placement above the Uppermost Aquifer Demonstration for Coal Combustion Residuals (CCR)

October 17, 2018

Prepared by

AECOM

Project Number: 60571713

TABLE OF CONTENTS

FIGURES

ATTACHMENTS

1.0 INTRODUCTION

1.1 Objective

The purpose of this demonstration is to document compliance with 40 Code of Federal Regulations (CFR §257.60 of the Environmental Protection Agency Final Coal Combustion Residual Rule (EPA Final CCR Rule)regarding the Placement above the Uppermost Aquifer Demonstration requirement for the existing "Reid/HMPL" Surface Impoundment at the Big Rivers Electric Corporation (BREC) Sebree Station in Sebree, Kentucky.

1.2 Rule Requirements

As required by 40 CFR §257.60(a) of the EPA Final CCR Rule, existing CCR Surface Impoundments must be constructed with a base that is located no less than 1.52 meters (5 feet) above the upper limit of the uppermost aquifer, or must demonstrate that there will not be an intermittent, recurring, or sustained hydraulic connection between any portion of the base of the CCR unit and the uppermost aquifer due to normal fluctuations in groundwater elevation. The "uppermost aquifer" is defined by 40 CFR §257.40 as the geologic formation nearest the natural ground surface that is an aquifer, as well as lower aquifers that are hydraulically interconnected with this aquifer within the facility's property boundary. This definition includes a shallow, deep, perched, confined or unconfined aquifer, provided it yields usable water.

The demonstration is due by October 17, 2018 in accordance with 40 CFR §257.60(c)(1). Those Surface Impoundments that cannot demonstrate compliance with the requirement of 40 CFR §257.60(a) are required by 40 CFR §257.60(c)(4) to cease placement of CCR in the unit within 6 months (April 2019).

1.3 Methodology/Background

The demonstration method involves the use of existing documentation of pertinent geologic and hydrogeologic information to develop a conceptual site model (CSM) for the uppermost aquifer inclusive of the definition of its uppermost limit, normal fluctuations in groundwater elevation, and the potential for the aquifer's hydraulic interconnection with overlying strata and the planned landfill limits. Existing documentation includes state and/or federal geologic maps and water resources publications, the logs of borings drilled on site for geotechnical purposes, the logs of monitoring wells installed on site and in surrounding areas, and design drawings for the unit.

1.4 Site Background

Big Rivers Electric Corporation (BREC) owns and operates the "Sebree" Station in Sebree, Kentucky. The Sebree Station is located in Webster County, approximately 3.2 miles northeast of the town of Sebree, Kentucky situated immediately east of the Pennyrile Parkway approximately 1.5 miles north of the intersection of the Pennyrile Parkway and Kentucky Route 56 (see Figure 1). Sebree Station is composed of 2 Green generating units, one Reid generating unit, and 2 HMP&L generating units. The Green Surface Impoundment is located directly south of the Sebree Station, situated north of the Green CCR Landfill. The current Green Surface Impoundment footprint is approximately 16 acres (Figure 2).

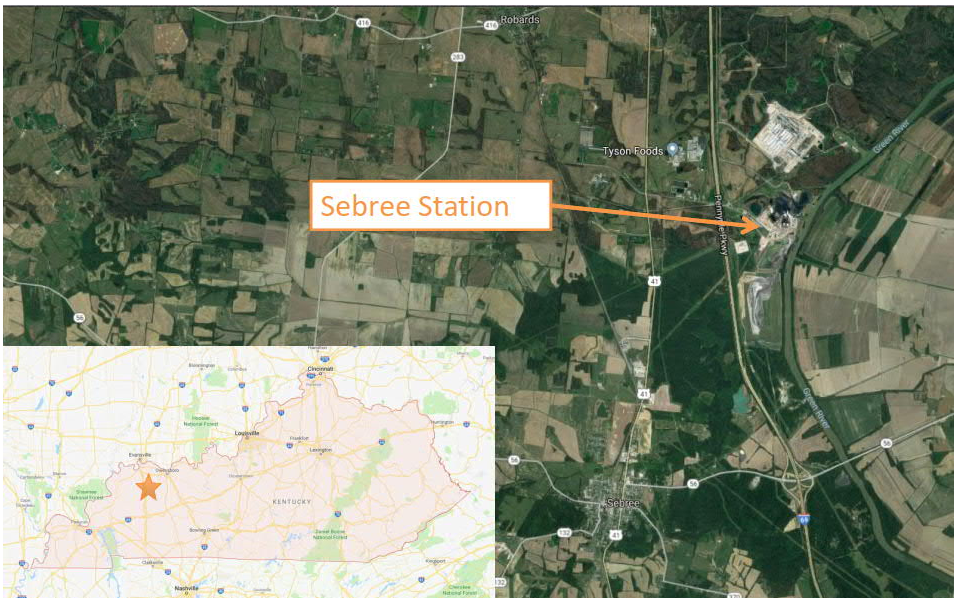


Figure 1: BREC Sebree Site Location

Figure 2: BREC Reid/HMPL Surface Impoundment Site Location

1.5 Site History

The Reid/HMPL Surface Impoundment is a combined incised/dike earthen embankment structure. It is diked on the west, south and east sides, while the north side is incised. The west dike has the greatest height reaching approximately 42 feet. The original terrain on which the Surface Impoundment was constructed generally sloped toward the west. Although the Green River is located less than 0.5 miles from the site, the structure does not extend significantly into the floodplain. Underlying preconstruction soils consisted of Loring-Grenada, Loring-Zanesville-Wellston (Henderson County) and Loring-Wellston-Zanesville (Webster County) soil associations are generally characterized as well drained to moderately well drained soils on nearly level to sloping uplands.

The CCR unit has been in place for 40 plus years and is used for the placement of CCR material; currently slurried bottom ash. The immediate watershed that drains to the CCR unit, and in which the CCR unit is considered to be located, is unnamed and 25.45 acres in size. The unnamed watershed discharges from the CCR impoundment outflow structure and is routed to the Green River.

The embankment reaches its greatest relief of approximately 42 feet on the west side. The Burns & McDonnell Engineering Co., October 8, 1971 design drawings show the inboard slope and central core portion of the dike to be constructed of compacted soil fill and the outboard slope to be consisted of sand fill. A sand blanket drain was designed for the outboard third of the base of the dike for the majority of the length and the plans show a crushed limestone drainage layer with a minimum thickness of 18 inches topped with a minimum 6-inches thick sand layer that extends across the entire width of the dike cross section in the southwest corner. The plans also show a cut-off trench in the original ground below dike crest and extending for the entire length of the dike.

The impoundment discharge consists of a rectangular concrete drop structure with a variable height steel debris skimmer. The pool elevation can be controlled by adding or removing stop logs. The discharge structure connects to a 24-inch diameter smooth walled metal pipe underground conveyance.

2.0 GEOLOGY

The site lies in the Western Kentucky Coalfields, a gently rolling upland. In the vicinity of the site, maximum topographic relief is on the order of 80 feet. Surface drainage is to the south to Groves Creek, a primary tributary to the Green River, and to the east to the Green River.

Published geologic mapping (Murphy, 2007) shows the site to be immediately underlain by unconsolidated loess representing the Pleistocene and Holocone geologic epoch and unconsolidated alluvium representing the Pleistocene and Holocene epochs. The loess reportedly consists of sandy and clayey silt. The alluvium reportedly consists of silt and clay with lesser amounts of sand and gravel.

The unconsolidated materials are shown to be underlain by the base of the Shelburn Formation (formerly identified as the Lisman Formation (Fairer, 1973) and the Carbondale Formation, both of which represent the Pennsylvanian Geologic Period. The West Franklin Member consists of

one to three layers of limestone interbedded by calcareous clay shale, and comprises the top of the Shelburn Formation. The Providence Limestone Member, consisting of limestone and interbedded shale, comprises the base of the Shelburn Formation. The Providence Limestone Member is reportedly absent in much of the area due to erosional channeling. Due to its discontinuous character and the presence of interbedded shale, hydrologically significant karst features are not present in the Providence Limestone Member. The underlying Carbondale Formation consists of cyclic sequences of sandstones, shales, siltstones and coals. The Carbondale sediments were deposited in a fluvial-deltaic system. As a result of this depositional environment, the lithologic units of the Carbondale tend to be lenticular bodies rather than continuous sheet-like strata. Gradational and abrupt horizontal changes in lithology are often encountered.

The structure contours illustrated on the geologic map (Murphy, 2007) are based on the altitude of the No. 9 coal seam, and show the site to lie on the flank of a gentle anticline. Stratigraphic dip is shown to be on the order of 35 feet per mile to the southeast. No faults or other significant structural features are depicted on the geologic map.

3.0 HYDROGEOLOGY

The stratigraphic interval considered as the most prominent water transmitting zone within and adjacent to the Sebree Generating Station is material identified as the Upper Sandstone Member (Sebree sandstone) of the Carbondale Formation. The United States Geologic Survey (USGS) Geologic Map of the Robards Quadrangle describes the Sebree sandstone sequence as "Siltstone, sandstone, shale and coal: Siltstone, light- to medium-gray, micaceous, thin-bedded, and locally calcareous. Sandstone, light- to medium-gray, grayish- and yellowish-brown, fine- to medium-grained slightly micaceous, thin-bedded to massive; locally fills channels."

For purposes of compliance with the CCR Rule groundwater monitoring requirements; this sequence, and in particular the member sandstone intervals, is considered to be the uppermost aquifer underlying the Reid/HMPL CCR Surface Impoundment.

The sandstone units in the upper Carbondale Formation reportedly can provide well yields of 500 gallons per day (gpd) or greater with some reported yields on the order of 30 gallons per minute [gpm] (Maxwell and Devaul, 1962). The Providence Limestone Member of the Shelburn Formation is reported to yield little to no water to wells. The lower Carbondale Formation, above and below the No. 9 coal seam, consists primarily of shales that reportedly yield little to no water to wells. Previous site-specific investigations, by others, have noted the presence of perched zones of saturation in the overlying unconsolidated materials.

3.1 Groundwater Monitoring System

Five temporary piezometers (P-13/P-13A, P-14 and P-15/P-15A) were installed adjacent to and respectively; northwest, southeast and southwest of the Reid/IIMPL CCR impoundment to determine general direction of groundwater movement. Measured static water levels, from the highest to lowest elevation were observed in P-13/13A (highest), P¬14 and P-15/P-15A (lowest) resulting in a calculated hydraulic gradient or apparent direction of groundwater movement is generally from east-northeast to west-southwest. This groundwater gradient characterization

and the ability to locate monitoring wells specific to the CCR unit justify the placement of the minimum of one upgradient and three down-gradient monitoring wells. The upgradient monitoring well (MW-7) was installed adjacent to, and east-northeast of the impoundment. The downgradient monitoring wells (MW-8, MW-9 and MW-10) were installed adjacent to, and respectively; west, southwest and south-southwest of the impoundment. All monitoring wells are completed in the stratigraphic interval described above. Approximate locations of the groundwater monitoring wells are shown on the Groundwater Monitoring Well Location Aerial Photo (**Attachment B**). Boring logs and well construction diagrams are presented as **Attachment C**.

3.2 Groundwater Flow

Water level data were collected from the unit during the nine baseline CCR monitoring events from March 2016 through October 2017as summarized on **Table 1** o**f Attachment A.**

These data and the piezometric surface map presented below (**Figure 3**) represent general conditions at the Surface Impoundment and support the following analysis.

Overall groundwater flow beneath the footprint of the Reid/HMPL Surface Impoundment is to the southwest towards an unnamed tributary to Groves Creek located west/southwest of the impoundment. The hydraulic gradients calculated during the baseline period ranged from 0.0251 to 0.0258 towards the southwest as presented in **Table 2** of **Attachment A**.

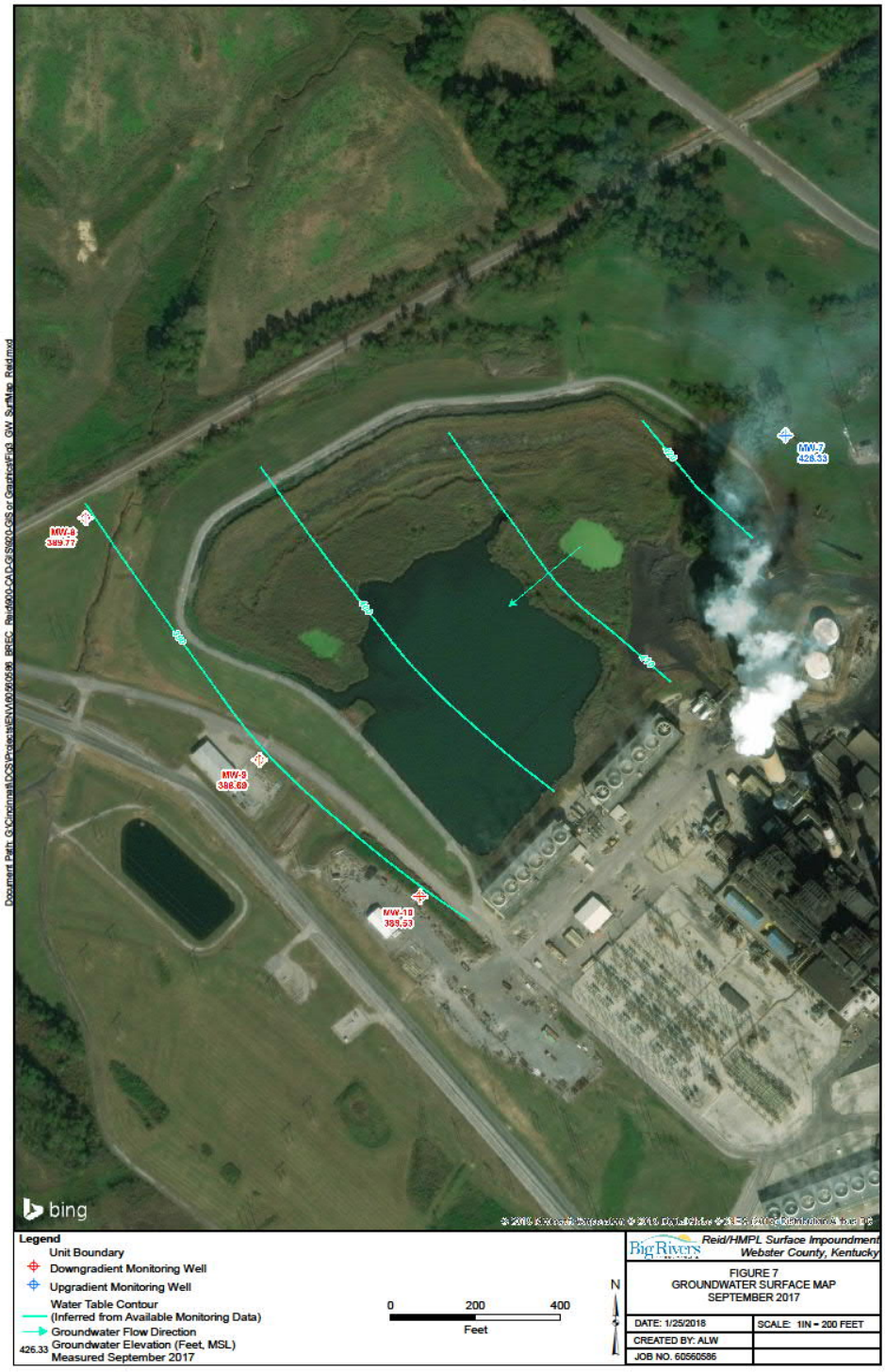


Figure 3: Reid/HMPL Surface Impoundment - Piezometric Surface Map

4.0 UPPERMOST AQUIFER

The "uppermost aquifer" is defined by 40 CFR §257.40 as the geologic formation nearest the natural ground surface that is an aquifer, as well as lower aquifers that are hydraulically interconnected with this aquifer within the facility's property boundary. This definition includes a shallow, deep, perched, confined or unconfined aquifer, provided it yields usable water.

4.1 Aquifer Characteristics

Site-specific data pertaining to the aquifer characteristics beneath the Reid/HMPL Surface Impoundment were obtained prior to initiation of this CCR Program.

Available information pertaining to the sandstone units in the upper Carbondale Formation, identified as the uppermost aquifer beneath the Surface Impoundment, generally provide well yields of 500 gpd or greater with some reported yields on the order of 30 gpm (Maxwell and Devaul, 1962). The Providence Limestone Member of the Shelburn Formation is reported to yield little to no water to wells. The lower Carbondale Formation, above and below the No. 9 coal seam, consists primarily of shales that reportedly yield little to no water to wells. Previous site-specific investigations, by others, have noted the presence of perched zones of saturation in the overlying unconsolidated materials.

4.2 Placement Above the Uppermost Aquifer

Based on the available boring logs from the CCR Rule monitoring well system, the top of the upper Carbondale Formation (uppermost aquifer) is at an approximately elevation of 413.4 feet to the northeast (at MW-7), 384.2 feet to the south (at MW-10), 364.4 feet to the southwest (at MW-9), and 341.6 feet to the west (at MW-8) of the Surface Impoundment. Illustrated well boring cross-sections located adjacent to the Surface Impoundment are presented as **Attachment B**. Although it is not directly evidenced whether the base of the Surface Impoundment (389.2 feet in the western corner and approximately 400 feet in the northeast corner) intercepts or encroaches on the 5 foot separation from the top of the upper Carbondale Formation (uppermost aquifer) in the vicinity of monitoring well MW-7, hydraulic connectivity cannot be disproven based on available groundwater surface data discussed below.

Groundwater data provided by BREC via baseline data collection from monitoring wells between March 2016 and October 2017 were used to interpret the elevations of the uppermost aquifer within the area of the Surface Impoundment. Seasonal measurements (March, May, August, October 2016, and January 2017) are presented within the Groundwater Elevation Summary located as **Attachment B**. Based on the cross sections presented in **Attachment B**, the potentiometric surface is approximately 0.5 and 2 feet above the lowest base of the Surface Impoundment (389.2 feet at the west corner) and averaging approximately 28 feet above the Surface Impoundment base of approximately 400 feet at the northeast corner.

5.0 CONCLUSIONS

Available data regarding site groundwater, site geology, and physical limits of the unit for the Reid/HMPL Surface Impoundment do not evidence a 5-foot separation between the base of the impoundment and the uppermost limit of the uppermost aquifer and they do not support a lack of hydraulic connectivity between the unit and the aquifer as specified in 40 CFR §257.60(a). Therefore the unit does not meet the Placement above the Uppermost Aquifer requirement of 40 CFR §257.60(a).

6.0 REFERENCES

Burns and Roe, Inc., Engineering and Consultants, June 30, 1978, Site Grading Plans.

Fairer, G.M., Geologic Map of the Robards Quadrangle, Henderson and Webster Counties, Kentucky, U.S. Geological Survey, 1973.

Geotechnical and other information provided by Associated Engineers, Inc.

Engineering design drawings and other information provided by Big Rivers Electric Corporation

Maxwell, B.W. and Devaul, R.W., Availability of Ground Water in Hopkins and Webster Counties, Kentucky, U.S. Geological Survey, 1962.

Murphy, 2007. Geological mapping.

United States Geological Survey U.S. Geological Survey (USGS) 7.5 minute Robards and Delaware topographic quadrangle maps

Attachments

Attachment A

Tables 1 and 2

TABLE 1

MONITORING WELL NETWORK GROUNDWATER ELEVATIONS - MARCH 2016 - OCTOBER 2017
REID/HMPL STATION SURFACE IMPOUNDMENT

BIG RIVERS ELECTRIC CORPORATION
SEBREE STATION
WEBSTER COUNTY, KENTUCKY

	GROUNDWATER MONITORING WELL NETWORK							
	MW-7		MW-8		MW-9		MW-10	
Reference Elevation TOIC*(ft, NAD27)	**Upgradient/Background 444.43**		**Downgradient 394.29**		**Downgradient 395.40**		**Downgradient 422.27**	
Date Measured	**Depth to Water (ft) (feet)**	**GW Elevation (feet)**	**Depth to Water (ft) (feet)**	**GW Elevation (feet)**	**Depth to Water (ft) (feet)**	**GW Elevation (feet)**	**Depth to Water (ft) (feet)**	**GW Elevation (feet)**
3/30/2016	14.93	429.5	1.64	392.65	3.44	391.96	31.71	390.56
5/31/2016	14.91	429.52	1.41	392.88	3.28	392.12	29.60	392.67
8/23/2016	15.75	428.68	1.42	392.87	3.56	391.84	29.96	392.31
10/18/2016	16.77	427.66	2.38	391.91	4.49	390.91	30.63	391.64
1/31/2017	15.59	428.84	1.94	392.35	4.16	391.24	30.63	391.64
2/9/2017	15.81	428.62	2.12	392.17	4.52	390.88	30.63	391.64
5/11/2017	15.73	428.70	1.74	392.55	4.05	391.35	30.20	392.07
8/23/2017	17.72	426.71	4.16	390.13	6.46	388.94	32.46	389.81
9/22/2017	18.10	426.33	4.52	389.77	6.71	388.69	32.74	389.53
10/11/2017	18.16	426.27	4.67	389.62	6.9	388.50	32.90	389.37

*Reference elevation of monitoring wells surveyed by Associated Engineers, Inc., Madisonville, Kentucky, January 2015
Survey coordinates were based on the Kentucky State Plane, Kentucky Southern Zone, NAD27 datum
TOIC = Top of internal casing
GW = Groundwater; GS = Ground Surface; NM = Not measured

TABLE 2

HYDRAULIC GRADIENT
GROUNDWATER MONITORING SYSTEM

BIG RIVERS ELECTRIC CORPORATION - SEBREE STATION
REID/HMPL STATION SURFACE IMPOUNDMENT
WEBSTER COUNTY, KENTUCKY

	Well ID / GW Elevation (ft, NAD27)		Change in Head (feet)	Horizontal Distance* (feet)	Hydraulic Gradient
	MW-7	MW-9			
Mar 2016	429.50	391.96	37.54	1466	0.0256
May 2016	429.52	392.12	37.40	1466	0.0255
Aug 2016	428.68	391.84	36.84	1466	0.0251
Oct 2016	427.66	390.91	36.75	1466	0.0251
Jan 2017	428.84	391.24	37.60	1466	0.0256
May 2017	428.70	391.35	37.35	1466	0.0255
Aug 2017	426.71	388.94	37.77	1466	0.0258
Sept 2017	426.33	388.69	37.64	1466	0.0257
Oct 2017	426.27	388.50	37.77	1466	0.0258

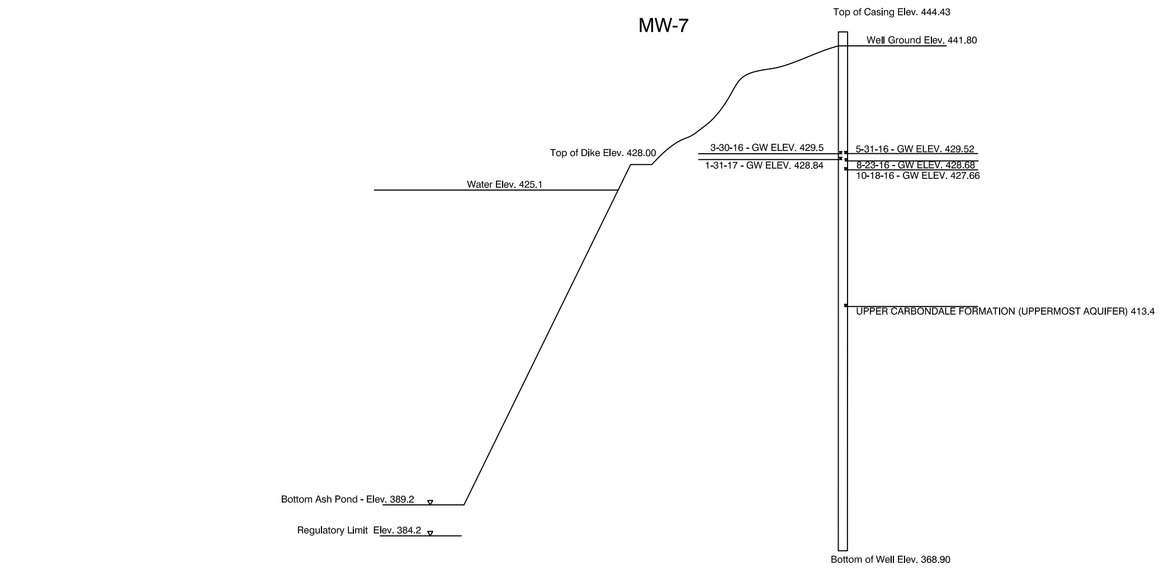
*Reference elevation of monitoring wells surveyed by Associated Engineers, Inc., Madisonville, Kentucky, January 2015

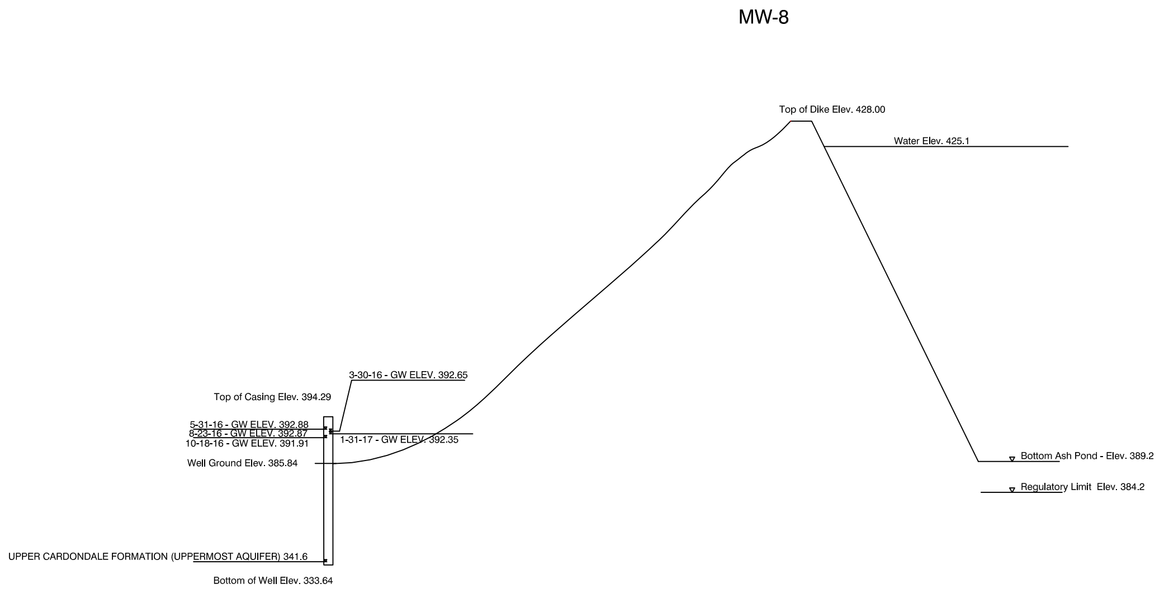
Survey coordinates were based on the Kentucky State Plane, Kentucky Southern Zone, NAD27 datum

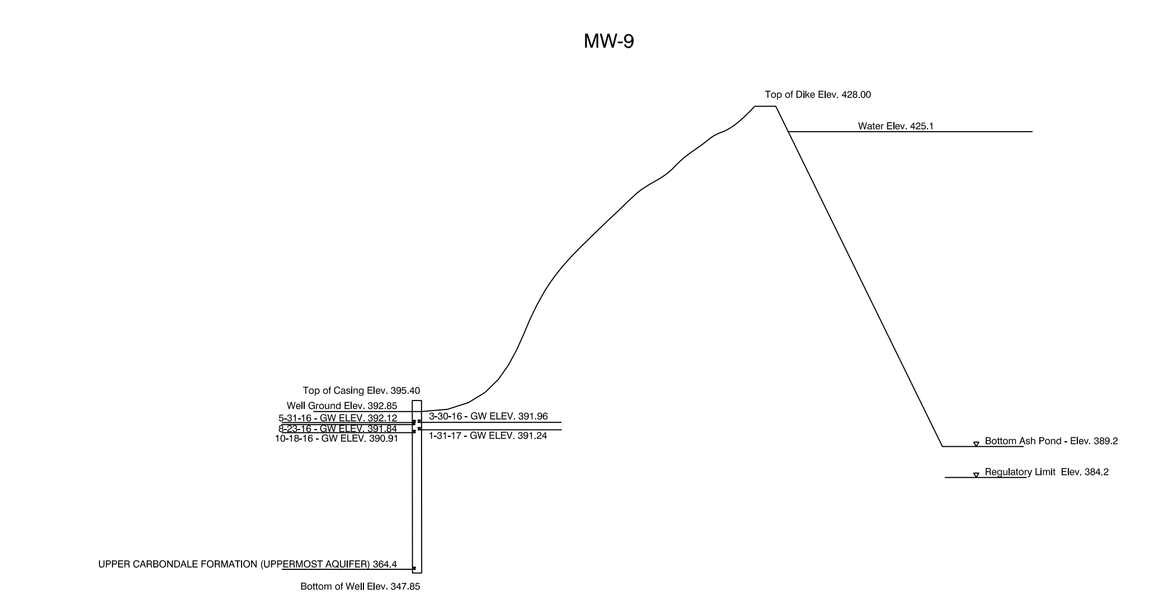
*Horizontal distance between monitoring wells, parallel to the direction of groundwater flow (as determined by measurements utilizing Kentucky GIS)

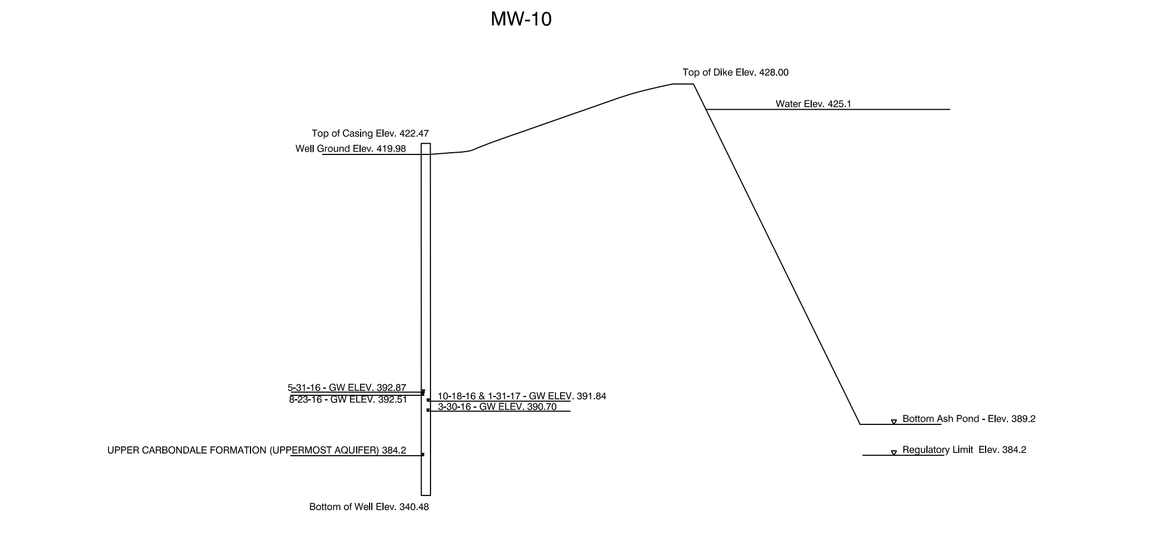
Attachment B

Groundwater Elevation Summary









REID/HMPL COAL COMBUSTION RESIDUALS SURFACE IMPOUNDMENT GROUNDWATER ELEVATION SUMMARY

Monitoring Well ID	Well Ground Elevation (feet, NAD27)	Top of Well Casing Elevation (feet, NAD27)	Total Well Depth (feet, TOIC)	Bottom of Well Elevation (feet, NAD27)	Depth to Top of Screened Interval (feet, GS)	Top of Screened Elevation (feet, NAD27)	Depth to Bottom of Screened Interval (feet, GS)	Bottom of Screened Elevation (feet, NAD27)	Bottom of Ash Pond Elevation	Depth to Water (feet, TOIC)	GW Elevation (feet, NAD27)	Depth to Water (feet, TOIC)	GW Elevation (feet, NAD27)	Depth to Water (feet, TOIC)	GW Elevation (feet, NAD27)	Depth to Water (feet, TOIC)	GW Elevation (feet, NAD27)	Depth to Water (feet, TOIC)	GW Elevation (feet, NAD27)
										3/30/2016		5/31/2016				10/18/2016			
MW-7	441.80	444.43	75.5	368.90	67.9	373.90	72.9	368.90	389.2	14.93	429.50	14.91	429.52	15.75	428.68	16.77	427.66	15.59	428.84
MW-8	385.84	394.29	60.7	333.64	47.2	338.64	52.2	333.64			392.65	1.41	392.88	1.42	392.87	2.38	391.91	1.94	392.35
MW-9	392.85	395.40	47.6	347.85	35.0	357.85	45.0	347.85			391.96	3.28	392.12	3.56	391.84	4.49	390.91	4.16	391.24
MW-10	419.98	422.47	82.0	340.48	69.5	350.48	79.5	340.48			390.70	29.6	392.87	29.96	392.51	30.63	391.84	30.63	391.84

Attachment C

Boring Logs and Well Construction Diagrams

UNIFORM KENTUCKY WELL CONSTRUCTION RECORD

Use this form only to report installation of monitoring or water wells.
Original copy must be submitted to Division of Water within 60 days of completion.
See instructions on reverse of form.
Record must be typed or neatly printed or it will be returned to the driller as unacceptable.
One copy to Division of Water, one copy to owner, one copy to driller's files.

8006- 3934

4. Owner name: Big Rivers Electric Corporation
5. Owner address: 201 Third Street
6. City: Henderson
7. State: KY
8. Zip: 42420

If site name and address differ from owner name and address:

9. Site name: Sebree Station
10. Site address: 9000 Highway 2096
11. City: Robards
12. State: KY
13. Zip: 42452

1. Kentucky Well ID (AKGWA) Number: 8006 - 3934
2. Owner well ID#: MW-7

3. Attachments
Required
1. Site plan or sketch map [X]
2. Well location
On topographic map, OR [X]
Obtained by GPS unit [ ]
Conditionally Required
3. Well diagram (monitoring well) [X]
4. Coliform analysis (if applicable) [ ]
5. Signed Variance (if applicable) [X]
Optional
6. Other laboratory analysis report [ ]

14. Agency Interest (AI) Number: 4196
15. Facility type & ID Number: [ ] CERCLA [ ] RCRA [ ] Solid Waste [ ] UST [ ] Drinking Water [ ] Mining — CCR Rule
16. Owner phone: 270 - 844 - 6031
17. Site phone: 270 - 521 - 7927
18. USGS topo map: Robards
19. County: Henderson
20. Physiographic Region: [ ] Blue Grass [ ] E. Coal Field [ ] Miss. Plateau [ ] Ohio River Alluvium [X] W. Coal Field [ ] Jackson Purchase
21. Surface elevation (ft): 441.8
22. Elevation determined by: [ ] GPS [ ] Map [ ] Prior report [X] Survey [ ] Prior well log

23. Install start date: 12 (Month) 4 (Day) 15 (Year)
24. Install end date: 1 (Month) 6 (Day) 15 (Year)

Please report depths in feet below ground surface, not as relative elevations.
25. Total depth: 73.4
26. Depth to bedrock: 24.1
27. Static water level: 12.30
28. Casing height above surface (in): 31.56

29. Well use: [ ] Agriculture [ ] Commercial [ ] Domestic [ ] Industrial [X] Monitoring / Remed 01 [ ] Public [ ] Geothermal [ ] Heat pump [ ] HVAC [ ] Injection [ ] Mining [ ] Unused
NOTE: CODE REQUIRED for most well uses. See back of form for codes.

30. Drilling method: [ ] Auger – HS [ ] Auger – SS [ ] Auger – bucket [ ] Auger – hand [ ] Cable tool [ ] Core [ ] Driven Casing [ ] Excavation [ ] Jet wash [ ] Push/probe [ ] Rotary – air [ ] Rotary – mud [ ] Rotary – reverse [ ] Sand point [ ] Sonic [ ] Unknown [X] Combined – HS auger and air rotary [ ] Combined – other (specify):

31. Well status: [X] Active [ ] Inactive [ ] Unsuitable for intended use
32. Wellhead: [ ] Flush [ ] Well cap [X] Locking [ ] Sanitary seal
33. Well development method: [ ] Surging [ ] Jetting [ ] Pumping [ ] Backwashing [ ] Bailing [ ] Compressed air [X] Combination of methods (specify): Air-lift pump and water flush

WATER WELLS ONLY

34. Estimated well yield: [ ] gpm [ ] gph [ ] gpd
35. Well service: #of people served
36. Disinfectant amount: [ ] oz [ ] qt [ ] cups [ ] lb [ ] gal
37. Type: [ ] Bleach [ ] Hypo-chlorite
38. Pitless adapter installed: [ ] Yes [ ] No
39. Pump installed: [ ] Submersible [ ] Jet [ ] Bailer or bucket [ ] Turbine [ ] Hand [ ] No pump
40. Depth to intake (ft):
41. Apparent quality and odor
APPEARANCE: [ ] Clear [ ] Cloudy [ ] Muddy [ ] Turbid
ODOR: none / slight / mod. / high
[ ] Iron [ ] Sulfur [ ] Salt

COLIFORM TEST

42. Coliform test type: [ ] fecal [ ] fecal and total
43. Coliform test results: [ ] 0 or <1.0 [ ] TNTC [ ] Confluent
or # colonies per 100 mL
44. Date sampled: Month Day Year
45. Date analyzed:

46. Well completion: Casing and screens

From depth (feet)	To depth (feet)	Borehole diameter (inches)	Casing diam (in) ID	Casing diam (in) OD	Casing type	Screen slot size
0.0	28.4	10.5	2.0	2.38	Sch 40 PVC	
28.4	67.9	6.5	2.0	2.38	Sch 40 PVC	
67.9	72.9	6.5	2.0	2.38	Sch 40 Screen	0.010

47. Annulus fill and seal

From depth (feet)	To depth (feet)	Material (NOTE for WATER WELLS only: If cuttings (clay, shale or limestone only) are used, you must specify composition.)
0.0	2.0	Concrete
2.0	63.9	Cement grout
63.9	65.9	Bentonite pellets
65.9	73.4	Silica sand

48. Lithologic log (if more space is needed, continue on separate page)

From depth (ft)	To depth (ft)	Description (include any show of water and indicate apparent quality)
		See attachment

49. Sketch map: See attachment

50. Comments
4 1/4" ID HSA followed by 10 1/2" drag bit advanced to 28.4'. 8" ID PVC casing set to 28.4'. 6 1/2" tricone bit advanced to 73.4'. Silica sand set 72.9'-73.4. 2" casing and screen set. Sand placed 65.9'-72.9'. Bentonite pellets set 63.9'-65.9'. After minimum 8 hour hydration time, cement grout set 28.4'-63.9' using tremie method. 8" casing pulled and grouting continued to 2'. Protective surface casing and pad installed after grout cured.

Latitude: 37.649307
Longitude: -87.503061
Lat/Long Method: [ ] INT [ ] GPS [X] SUR [ ] REP
Date Received:

51. Affirmation: The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.
Note: the driller is not responsible for natural groundwater quality or quantity encountered while drilling or completing this well.

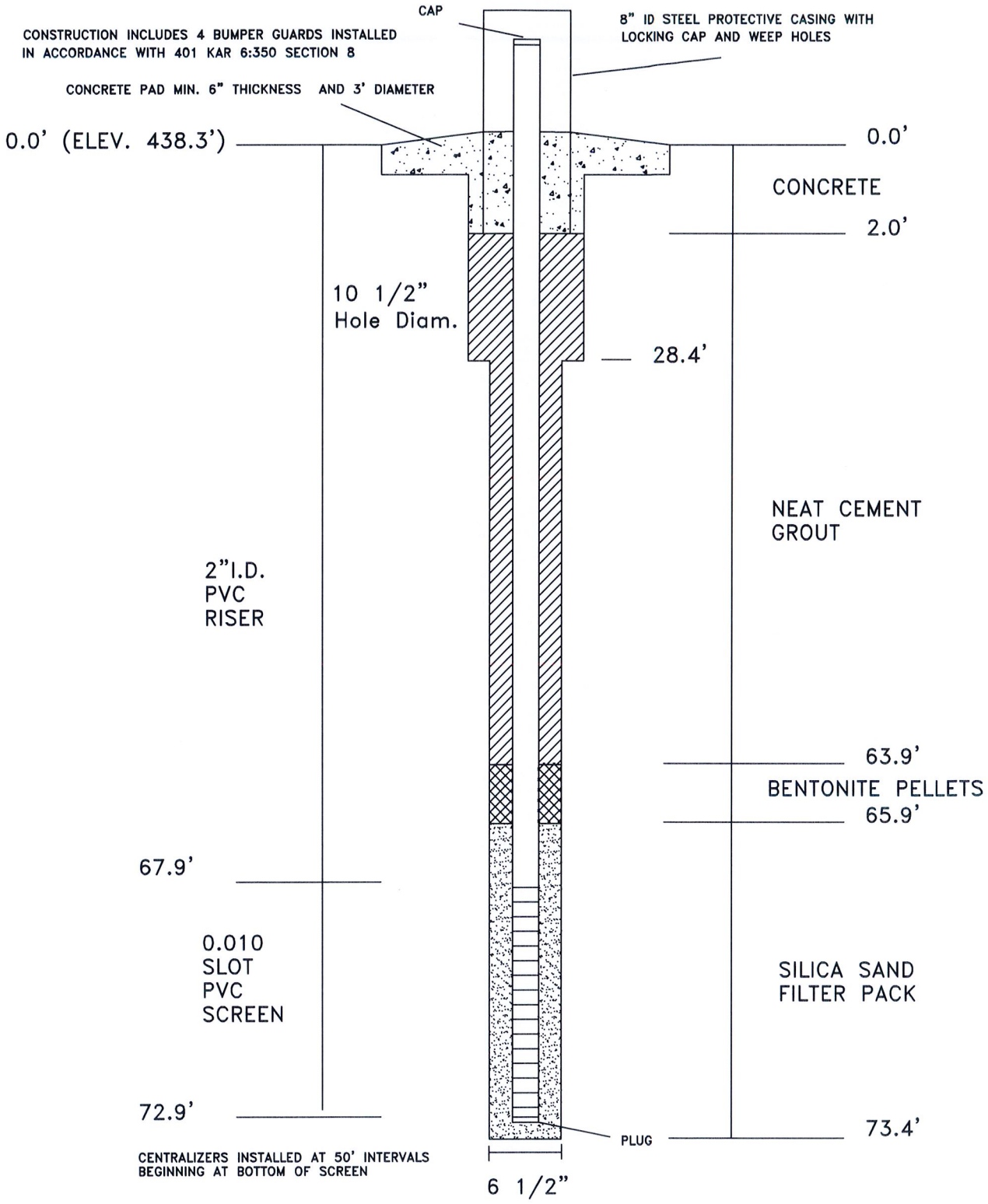
Signature of certified driller: [signature] Date signed: 5/25/16
Certification number: 0219-0364-00
Drilling company: Associated Engineers, Inc.

rev 02/29/2012

48. Lithologic Log MW-7

From depth (ft)	To depth (ft)	Description
0.0	6.5	Silty clay brown
6.5	11.7	Silty clay brown, moist
11.7	12.9	Silty clay yellowish brown moist
12.9	15.5	Sandy clay yellowish brown moist
15.5	18.8	Sandy clay yellowish brown moist
18.8	24.1	Silty sand yellowish brown wet
24.1	28.4	Sandstone yellowish brown weathered
	28.4	Auger refusal
28.4	33.8	Sandstone yellowish brown weathered
33.8	37.3	Shale dark gray
37.3	49.8	Shale gray soft
49.8	51.4	Shale w/interbedded shale gray soft
51.4	55.3	Sandstone gray hard
55.3	57.6	Sandstone w/sandy shale streaks gray
57.6	63.4	Sandy shale gray
63.4	66.7	Shale gray
66.7	67.0	Sandy shale gray
67.0	67.5	Shale gray w/interbedded sandstone
67.5	73.4	Sandstone gray
	73.4	TD

MONITORING WELL 8006-3934
(MW-7)



BIG RIVERS ELECTRIC CORPORATION	Job Number:	15-0140F	Revisions:
	Date:	12/28/15	
Well Construction Diagram	Scale:	No Scale	
	Drawn By:	D. Dunbar	

ASSOCIATED ENGINEERS, INC.
2740 North Main St. · Madisonville, KY 42431
Phone: (270) 821-7732 · Fax: (270) 821-7789
www.associatedengineers.com

UNIFORM KENTUCKY WELL CONSTRUCTION RECORD

Use this form only to report installation of monitoring or water wells.
Original copy must be submitted to Division of Water within 60 days of completion.
See instructions on reverse of form.
Record must be typed or neatly printed or it will be returned to the driller as unacceptable.
One copy to Division of Water, one copy to owner, one copy to driller's files.

Attach Well Identification Number (AKGWA) Label Here
Water wells: yellow labels
Monitoring wells: blue labels

4. Owner name: Big Rivers Electric Corporation
5. Owner address: 201 Third Street
6. City: Henderson
7. State: KY
8. Zip: 42420
If site name and address differ from owner name and address:
9. Site name: Sebree Station
10. Site address: 9000 Highway 2096
11. City: Robards
12. State: KY
13. Zip: 42452

1. Kentucky Well ID (AKGWA) Number: 8006 - 3935
2. Owner well ID#: MW-8

3. Attachments
Required
1. Site plan or sketch map [X]
2. Well location
On topographic map, OR [X]
Obtained by GPS unit [ ]
Conditionally Required
3. Well diagram (monitoring well) [X]
4. Coliform analysis (if applicable) [ ]
5. Signed Variance (if applicable) [X]
Optional
6. Other laboratory analysis report [ ]

14. Agency Interest (AI) Number: 4196
15. Facility type & ID Number: [ ] CERCLA [ ] RCRA [ ] Solid Waste [ ] UST [ ] Drinking Water [ ] Mining — CCR Rule
16. Owner phone: 270 - 844 - 6031
17. Site phone: 270 - 521 - 7927
18. USGS topo map: Robards
19. County: Henderson
20. Physiographic Region: [ ] Blue Grass [ ] E. Coal Field [ ] Miss. Plateau [ ] Ohio River Alluvium [X] W. Coal Field [ ] Jackson Purchase
21. Surface elevation (ft): 385.84
22. Elevation determined by: [ ] GPS [ ] Map [ ] Prior report [X] Survey [ ] Prior well log

23. Install start date: 12 (Month) 10 (Day) 15 (Year)
24. Install end date: 07 (Month) 06 (Day) 16 (Year)

Please report depths in feet below ground surface, not as relative elevations.
25. Total depth: 54.2
26. Depth to bedrock: 44.2
27. Static water level: -6.81
28. Casing height above surface (in): 105.24

29. Well use: [ ] Agriculture [ ] Commercial [ ] Domestic [ ] Industrial [X] Monitoring / Remed 01 [ ] Public [ ] Geothermal [ ] Heat pump [ ] HVAC [ ] Injection [ ] Mining [ ] Unused
NOTE: CODE REQUIRED for most well uses. See back of form for codes.

30. Drilling method: [ ] Auger – HS [ ] Auger – SS [ ] Auger – bucket [ ] Auger – hand [ ] Cable tool [ ] Core [ ] Driven Casing [ ] Excavation [X] Combined – HS auger and air rotary [ ] Combined – other (specify): [ ] Jet wash [ ] Push/probe [ ] Rotary – air [ ] Rotary – mud [ ] Rotary – reverse [ ] Sand point [ ] Sonic [ ] Unknown

31. Well status: [X] Active [ ] Inactive [ ] Unsuitable for intended use
32. Wellhead: [ ] Flush [ ] Well cap [X] Locking [ ] Sanitary seal
33. Well development method: [ ] Surging [ ] Jetting [ ] Pumping [ ] Backwashing [ ] Bailing [ ] Compressed air [X] Combination of methods (specify): Air-lift pump and water flush

WATER WELLS ONLY

34. Estimated well yield: [ ] gpm [ ] gph [ ] gpd
35. Well service: #of people served
36. Disinfectant amount: [ ] oz [ ] qt [ ] cups [ ] lb [ ] gal
37. Type: [ ] Bleach [ ] Hypo-chlorite
38. Pitless adapter installed: [ ] Yes [ ] No
39. Pump installed: [ ] Submersible [ ] Jet [ ] Bailer or bucket [ ] Turbine [ ] Hand [ ] No pump
40. Depth to intake (ft):
41. Apparent quality and odor
APPEARANCE: [ ] Clear [ ] Cloudy [ ] Muddy [ ] Turbid
ODOR: none / slight / mod. / high — [ ] Iron [ ] Sulfur [ ] Salt

COLIFORM TEST

42. Coliform test type: [ ] fecal [ ] fecal and total
43. Coliform test results: [ ] 0 or <1.0 [ ] TNTC [ ] Confluent or # colonies per 100 mL
44. Date sampled: Month Day Year
45. Date analyzed:

46. Well completion: Casing and screens

From depth (feet)	To depth (feet)	Borehole diameter (inches)	Casing diam (in) ID	Casing diam (in) OD	Casing type	Screen slot size
0.0	44.2	10.5	2.0	2.38	Sch 40 PVC	
44.2	47.2	6.5	2.0	2.38	Sch 40 PVC	
47.2	52.2	6.5	2.0	2.38	Sch 40 Screen	0.010

47. Annulus fill and seal

From depth (feet)	To depth (feet)	Material (NOTE for WATER WELLS only: If cuttings (clay, shale or limestone only) are used, you must specify composition.)
0.0	2.0	Concrete
2.0	43.2	Cement grout
43.2	45.2	Bentonite pellets
45.2	54.2	Silica sand

48. Lithologic log (if more space is needed, continue on separate page)

From depth (ft)	To depth (ft)	Description (include any show of water and indicate apparent quality)
		See attachment

49. Sketch map: See attachment

50. Comments
4 1/4" ID HSA followed by 10 1/2" drag bit advanced to 44.2'. 8" ID PVC casing set to 44.2'. 6 1/2" tricone bit advanced to 54.2'. Silica sand set 52.2'-54.2'. 2" casing and screen set. Sand placed 45.2'-52.2'. Bentonite pellets set 44.2'-45.2'. Pellets set from 43.2' to 44.2 as casing pulled to 43.2. After 8 hour hydration time not able to pull 8" casing due to soil squeeze. Remaining annulus grouted with cement using tremie method. Pad installed after grout cured. Protective casing installed after artesian condition stabilized (See 6/22/16 variance request).

Latitude: 37.648863
Longitude: -87.508597
Lat/Long Method: [ ] INT [ ] GPS [ ] SUR [ ] REP

51. Affirmation: The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.
Note: the driller is not responsible for natural groundwater quality or quantity encountered while drilling or completing this well.

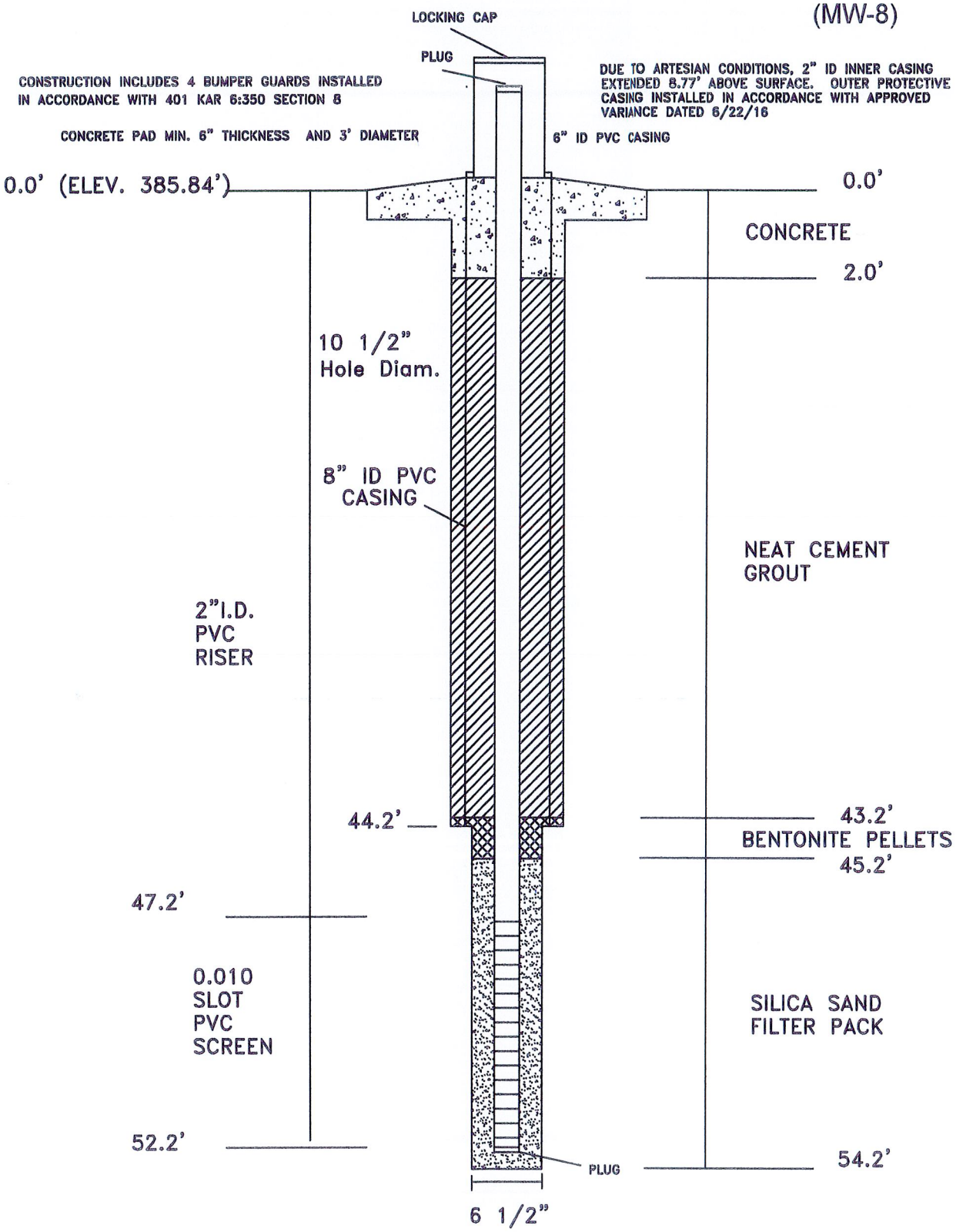
Signature of certified driller: [signature] Date signed: 08/31/16
Certification number: 0219-0364-00
Drilling company: Associated Engineers, Inc.
Date Received:

rev 02/29/2012

48. Lithologic Log MW-8

From depth (ft)	To depth (ft)	Description
0.0	0.3	Topsoil
0.3	3.0	Silty clay brown
3.0	7.0	Silty clay gray moist
7.0	10.0	Silty clay brown very moist
10.0	21.5	Silty clay brown wet
21.5	27.0	Silty clay gray wet
27.0	44.2	Silty clay w/gravel gray wet
	44.2	Auger refusal
44.2	48.4	Sandstone gray hard
48.4	49.5	Sandstone w/carbonaceous strks gray hard
49.5	51.0	Sandstone gray hard
51.0	51.8	Sandstone w/ shale strks gray
51.8	54.2	Sandy shale and interbedded sandstone gray
	54.2	TD

MONITORING WELL 8006-3935
(MW-8)



BIG RIVERS ELECTRIC CORPORATION	Job Number:	15-0140F	Revisions:
	Date:	12/28/15	
Well Construction Diagram	Scale:	No Scale	
	Drawn By:	D. Dunbar	

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www.associatedengineers.com

UNIFORM KENTUCKY WELL CONSTRUCTION RECORD

Use this form only to report installation of monitoring or water wells.
Original copy must be submitted to Division of Water within 60 days of completion.
See instructions on reverse of form.
Record must be typed or neatly printed or it will be returned to the driller as unacceptable.
One copy to Division of Water, one copy to owner, one copy to driller's files.

8006- 3936

4. Owner name Big Rivers Electric Corporation
5. Owner address 201 Third Street
6. City Henderson **7. State** KY **8. Zip** 42420
If site name and address differ from owner name and address:
9. Site name Sebree Station
10. Site address 9000 Highway 2096
11. City Robards **12. State** KY **13. Zip** 42452

1. Kentucky Well ID (AKGWA) Number 8006 - 3936
2. Owner well ID# MW-9

3. Attachments
Required
1. Site plan or sketch map [X]
2. Well location
On topographic map, OR [X]
Obtained by GPS unit [ ]
Conditionally Required
3. Well diagram (monitoring well) [X]
4. Coliform analysis (if applicable) [ ]
5. Signed Variance (if applicable) [X]
Optional
6. Other laboratory analysis report [ ]

14. Agency Interest (AI) Number 4196
15. Facility type & ID Number [ ] CERCLA [ ] RCRA [ ] Solid Waste [ ] UST [ ] Drinking Water [ ] Mining — CCR Rule
16. Owner phone 270 - 844 - 6031
17. Site phone 270 - 521 - 7927
18. USGS topo map Robards
19. County Henderson
20. Physiographic Region [ ] Blue Grass [ ] E. Coal Field [ ] Miss. Plateau [ ] Ohio River Alluvium [X] W. Coal Field [ ] Jackson Purchase
21. Surface elevation (ft) 392.85
22. Elevation determined by [ ] GPS [ ] Map [ ] Prior report [X] Survey [ ] Prior well log

23. Install start date 11 (Month) 23 (Day) 15 (Year)
24. Install end date 11 (Month) 25 (Day) 15 (Year)

Please report depths in feet below ground surface, not as relative elevations.
25. Total depth 56.3
26. Depth to bedrock 28.2
27. Static water level 0.89
28. Casing height above surface (in) 30.60

29. Well use
[ ] Agriculture [ ] Commercial [ ] Domestic [ ] Industrial [X] Monitoring / Remed 01 [ ] Public [ ] Geothermal [ ] Heat pump [ ] HVAC [ ] Injection [ ] Mining [ ] Unused
NOTE: CODE REQUIRED for most well uses. See back of form for codes.

30. Drilling method
[ ] Auger – HS [ ] Auger – SS [ ] Auger – bucket [ ] Auger – hand [ ] Cable tool [ ] Core [ ] Driven Casing [ ] Excavation [X] Combined – HS auger and air rotary [ ] Combined – other (specify): [ ] Jet wash [ ] Push/probe [ ] Rotary – air [ ] Rotary – mud [ ] Rotary – reverse [ ] Sand point [ ] Sonic [ ] Unknown

31. Well status [X] Active [ ] Inactive [ ] Unsuitable for intended use

32. Wellhead [ ] Flush [ ] Well cap [X] Locking [ ] Sanitary seal

33. Well development method [ ] Surging [ ] Jetting [ ] Pumping [ ] Backwashing [ ] Bailing [ ] Compressed air [X] Combination of methods (specify): Air-lift pump and water flush

WATER WELLS ONLY
34. Estimated well yield [ ] gpm [ ] gph [ ] gpd
35. Well service #of people served
36. Disinfectant amount [ ] oz [ ] qt [ ] cups [ ] lb [ ] gal
37. Type [ ] Bleach [ ] Hypo-chlorite
38. Pitless adapter installed [ ] Yes [ ] No
39. Pump installed: [ ] Submersible [ ] Jet [ ] Bailer or bucket [ ] Turbine [ ] Hand [ ] No pump
40. Depth to intake (ft)
41. Apparent quality and odor
APPEARANCE: [ ] Clear [ ] Cloudy [ ] Muddy [ ] Turbid
ODOR: none / slight / mod. / high
[ ] [ ] [ ] [ ] Iron
[ ] [ ] [ ] [ ] Sulfur
[ ] [ ] [ ] [ ] Salt

COLIFORM TEST
42. Coliform test type [ ] fecal [ ] fecal and total
43. Coliform test results [ ] 0 or <1.0 [ ] TNTC [ ] Confluent
or # colonies per 100 mL
44. Date sampled Month Day Year
45. Date analyzed

46. Well completion: Casing and screens

From depth (feet)	To depth (feet)	Borehole diameter (inches)	Casing diam (in) ID	Casing diam (in) OD	Casing type	Screen slot size
0.0	28.5	10.5	2.0	2.38	Sch 40 PVC	
28.5	35.0	6.5	2.0	2.38	Sch 40 PVC	
35.0	45.0	6.5	2.0	2.38	Sch 40 Screen	0.010

47. Annulus fill and seal

From depth (feet)	To depth (feet)	Material (NOTE for WATER WELLS only: If cuttings (clay, shale or limestone only) are used, you must specify composition.)
0.0	2.0	Concrete
2.0	28.5	Cement grout
28.5	33.0	Bentonite pellets
33.0	56.3	Silica sand

48. Lithologic log (if more space is needed, continue on separate page)

From depth (ft)	To depth (ft)	Description (include any show of water and indicate apparent quality)
		See attachment

49. Sketch map
See attachment

50. Comments
4 1/4" ID HSA followed by 10 1/2" drag bit advanced to 28.5'. 8" ID PVC casing set to 28.5'. 6 1/2" tricone bit advanced to 56.3'. Silica sand set 45.0'-56.3'. 2" casing and screen set. Sand placed 33.0'-45.0'. Bentonite pellets set 28.5'-33.0'. 8" casing pulled after minimum 8 hour hydration time. Hole grouted 2'-63.5'. Protective surface casing and pad installed after grout cured.

Latitude 37.647299
Longitude -87.507169
Lat/Long Method [ ] INT [ ] GPS [X] SUR [ ] REP
Date Received

51. Affirmation: The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.
Note: the driller is not responsible for natural groundwater quality or quantity encountered while drilling or completing this well.

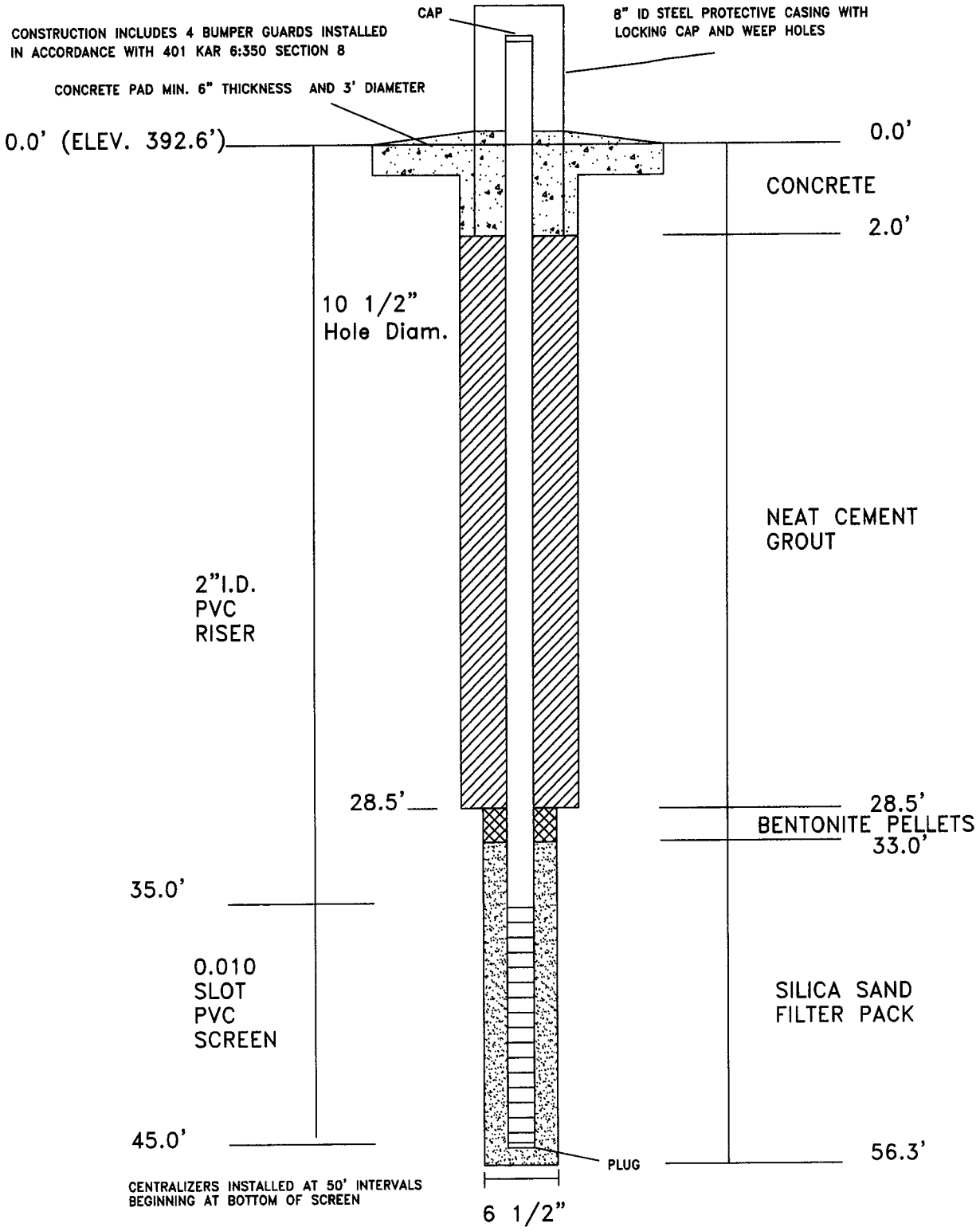
Signature of certified driller [signature] **Date signed** 5/25/16
Certification number 0219-0364-00
Drilling company Associated Engineers, Inc.

rev 02/29/2012

48. Lithologic Log MW-9

From depth (ft)	To depth (ft)	Description
0.0	1.5	Clay dark brown trace grass and roots
1.5	12.0	Clay yellowish brown moist
12.0	23.2	Clay brown wet
23.2	28.2	Sandy clay gray wet
28.2	28.5	Sandstone yellowish brown soft weathered
	28.5	Auger refusal
28.5	30.5	Sandstone yellowish brown soft weathered
30.5	33.2	Sandstone gray soft
33.2	34.8	Sandstone gray
34.8	36.6	Sandstone yellowish brown soft weathered
36.6	44.6	Sandstone gray
44.6	50.8	Shale and interbedded sandstone gray abundant carbonaceous laminations
50.8	53.6	Shale gray
53.6	56.3	Shale and interbedded sandstone gray
	56.3	TD

MONITORING WELL 8006-3936
(MW-9)



BIG RIVERS ELECTRIC CORPORATION	Job Number:	15-0140F	Revisions:
	Date:	12/28/15	
Well Construction Diagram	Scale:	No Scale	
	Drawn By:	D. Dunbar	

ASSOCIATED ENGINEERS, INC.

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UNIFORM KENTUCKY WELL CONSTRUCTION RECORD

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Original copy must be submitted to Division of Water within 60 days of completion.
See instructions on reverse of form.
Record must be typed or neatly printed or it will be returned to the driller as unacceptable.
One copy to Division of Water, one copy to owner, one copy to driller's files.

8006- 3937

4. Owner name: Big Rivers Electric Corporation
5. Owner address: 201 Third Street
6. City: Henderson
7. State: KY
8. Zip: 42420
If site name and address differ from owner name and address:
9. Site name: Sebree Station
10. Site address: 9000 Highway 2096
11. City: Robards
12. State: KY
13. Zip: 42452

1. Kentucky Well ID (AKGWA) Number: 8006 - 3937
2. Owner well ID#: MW-10

3. Attachments
Required
1. Site plan or sketch map [X]
2. Well location
On topographic map, OR [X]
Obtained by GPS unit [ ]
Conditionally Required
3. Well diagram (monitoring well) [X]
4. Coliform analysis (if applicable) [ ]
5. Signed Variance (if applicable) [X]
Optional
6. Other laboratory analysis report [ ]

14. Agency Interest (AI) Number: 4196
15. Facility type & ID Number: [ ] CERCLA [ ] RCRA [ ] Solid Waste [ ] UST [ ] Drinking Water [ ] Mining — CCR Rule
16. Owner phone: 270 - 844 - 6031
17. Site phone: 270 - 521 - 7927
18. USGS topo map: Robards
19. County: Webster
20. Physiographic Region: [ ] Blue Grass [ ] E. Coal Field [ ] Miss. Plateau [ ] Ohio River Alluvium [X] W. Coal Field [ ] Jackson Purchase
21. Surface elevation (ft): 419.98
22. Elevation determined by: [ ] GPS [ ] Map [ ] Prior report [X] Survey [ ] Prior well log

23. Install start date: 12 (Month) 1 (Day) 15 (Year)
24. Install end date: 1 (Month) 5 (Day) 15 (Year)

Please report depths in feet below ground surface, not as relative elevations.
25. Total depth: 80.0
26. Depth to bedrock: 28.5
27. Static water level: 29.28
28. Casing height above surface (in): 29.88

29. Well use: [ ] Agriculture [ ] Commercial [ ] Domestic [ ] Industrial [X] Monitoring / Remed 01 [ ] Public [ ] Geothermal [ ] Heat pump [ ] HVAC [ ] Injection [ ] Mining [ ] Unused
NOTE: CODE REQUIRED for most well uses. See back of form for codes.

30. Drilling method: [ ] Auger – HS [ ] Auger – SS [ ] Auger – bucket [ ] Auger – hand [ ] Cable tool [ ] Core [ ] Driven Casing [ ] Excavation [ ] Jet wash [ ] Push/probe [ ] Rotary – air [ ] Rotary – mud [ ] Rotary – reverse [ ] Sand point [ ] Sonic [ ] Unknown [X] Combined – HS auger and air rotary [ ] Combined – other (specify):

31. Well status: [X] Active [ ] Inactive [ ] Unsuitable for intended use
32. Wellhead: [ ] Flush [ ] Well cap [X] Locking [ ] Sanitary seal
33. Well development method: [ ] Surging [ ] Jetting [ ] Pumping [ ] Backwashing [ ] Bailing [ ] Compressed air [X] Combination of methods (specify): Air-lift pump and water flush

WATER WELLS ONLY
34. Estimated well yield: [ ] gpm [ ] gph [ ] gpd
35. Well service: #of people served
36. Disinfectant amount: [ ] oz [ ] qt [ ] cups [ ] lb [ ] gal
37. Type: [ ] Bleach [ ] Hypo-chlorite
38. Pitless adapter installed: [ ] Yes [ ] No
39. Pump installed: [ ] Submersible [ ] Jet [ ] Bailer or bucket [ ] Turbine [ ] Hand [ ] No pump
40. Depth to intake (ft):
41. Apparent quality and odor
APPEARANCE: [ ] Clear [ ] Cloudy [ ] Muddy [ ] Turbid
ODOR: none / slight / mod. / high — [ ] Iron [ ] Sulfur [ ] Salt

COLIFORM TEST
42. Coliform test type: [ ] fecal [ ] fecal and total
43. Coliform test results: [ ] 0 or <1.0 [ ] TNTC [ ] Confluent or # colonies per 100 mL
44. Date sampled: Month Day Year
45. Date analyzed:

46. Well completion: Casing and screens

From depth (feet)	To depth (feet)	Borehole diameter (inches)	Casing diam (in) ID	Casing diam (in) OD	Casing type	Screen slot size
0.0	29.4	10.5	2.0	2.38	Sch 40 PVC	
29.4	69.5	6.5	2.0	2.38	Sch 40 PVC	
69.5	79.5	6.5	2.0	2.38	Sch 40 Screen	0.010

47. Annulus fill and seal

From depth (feet)	To depth (feet)	Material (NOTE for WATER WELLS only: If cuttings (clay, shale or limestone only) are used, you must specify composition.)
0.0	2.0	Concrete
2.0	63.5	Cement grout
63.5	67.5	Bentonite pellets
67.5	80.0	Silica sand

48. Lithologic log (if more space is needed, continue on separate page)

From depth (ft)	To depth (ft)	Description (include any show of water and indicate apparent quality)
		See attachment

49. Sketch map: See attachment

50. Comments
4 1/4" ID HSA followed by 10 1/2" drag bit advanced to 29.4'. 8" ID PVC casing set to 29.4'. 6 1/2" tricone bit advanced to 80.0'. Silica sand set 79.5'-80.0'. 2" casing and screen set. Sand placed 67.5'-79.5'. Bentonite pellets set 63.5'-67.5'. After minimum 8 hour hydration time, cement grout set 29.4'-63.5' using tremie method. 8" casing pulled and grouting continued to 2'. Protective surface casing and pad installed after grout cured.

Latitude: 37.646374
Longitude: -87.505864
Lat/Long Method: [ ] INT [ ] GPS [X] SUR [ ] REP
Date Received:

51. Affirmation: The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.
Note: the driller is not responsible for natural groundwater quality or quantity encountered while drilling or completing this well.

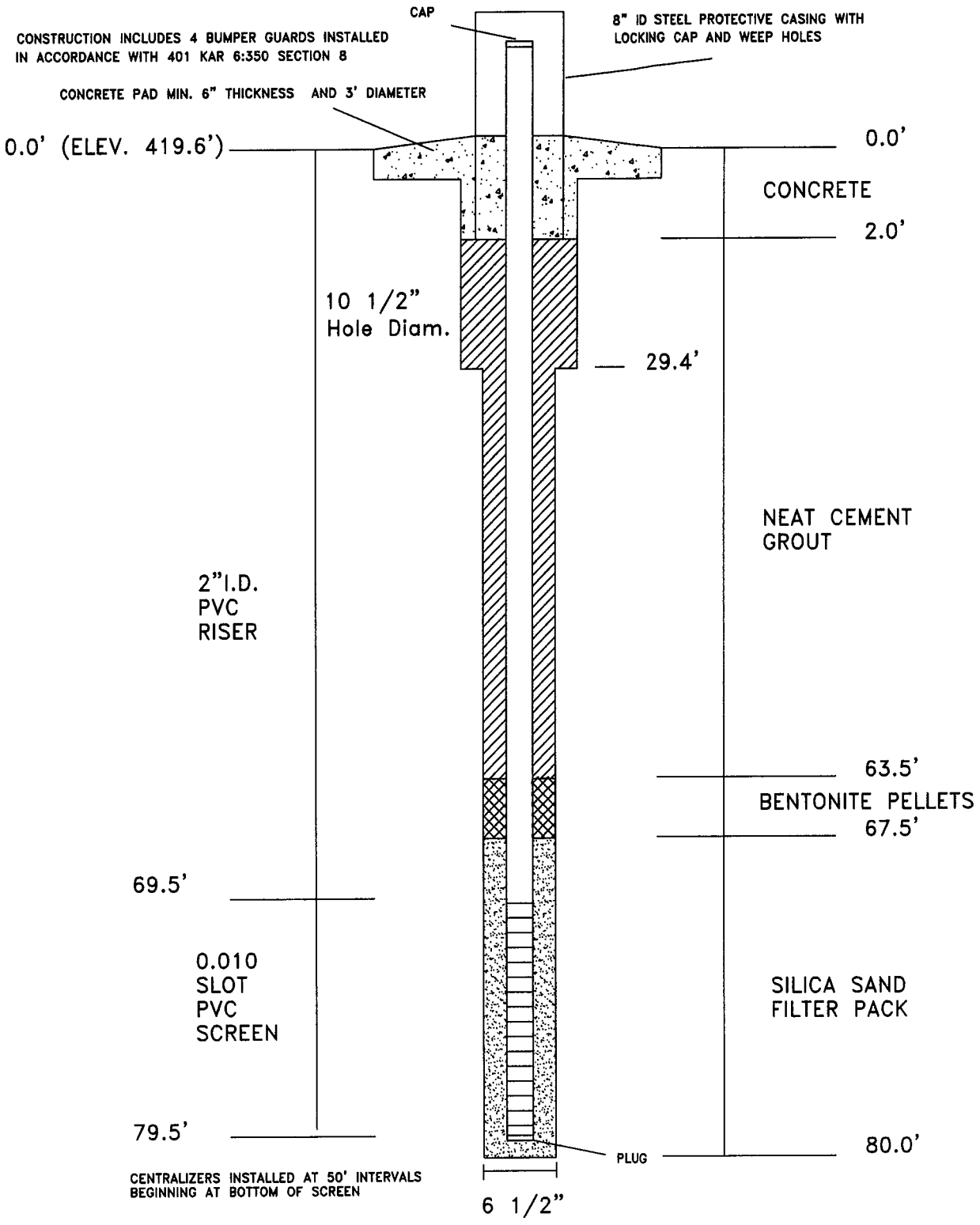
Signature of certified driller: [signature] Date signed: 5/25/16
Certification number: 0219-0364-00
Drilling company: Associated Engineers, Inc.

rev 02/29/2012

48. Lithologic Log MW-10

From depth (ft)	To depth (ft)	Description
0.0	0.3	Dense graded aggregate
0.3	12.9	Silty clay yellowish brown
12.9	14.0	Silty clay brown moist
14.0	17.5	Sandy clay brown wet
17.5	28.5	Sandy clay yellowish brown wet
28.5	29.4	Shale gray soft
	29.4	Auger refusal
30.0	35.8	Shale gray soft
35.8	37.6	Sandstone gray
37.6	48.5	Shale and interbedded sandstone gray
48.5	52.3	Sandstone gray
52.3	54.5	Shale and interbedded sandstone gray
54.5	55.6	Shale gray
55.6	59.7	Shale gray soft
59.7	60.9	Shale and interbedded sandstone gray
60.9	64.6	Shale gray
64.6	65.6	Sandy shale gray
65.6	66.5	Sandstone gray
66.5	68.4	Shale and interbedded sandstone gray
68.4	79.4	Sandstone gray
79.4	80.0	Shale and interbedded sandstone gray
	80.0	TD

MONITORING WELL 8006-3937
(MW-10)



BIG RIVERS ELECTRIC CORPORATION	Job Number:	15-0140F	Revisions:
	Date:	12/28/15	
Well Construction Diagram	Scale:	No Scale	
	Drawn By:	D. Dunbar	

ASSOCIATED ENGINEERS, INC.

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